



Neutron Engineering Inc.

Radio Test Report

FCC ID: V3DR8001

This report concerns (check one) : ☒ Original Grant ☐ Class II Change

Issued Date : Jun. 26, 2013
Project No. : 1304143
Equipment : RF Module
Model Name : R8001

Applicant : RIOTEC Co., Ltd.
Address : 8F, No. 196-2, Ta-Tung Rd., Sec. 3,
Xizhi Dist., New Taipei City 221, Taiwan
(R.O.C.)

Tested by: Neutron Engineering Inc. EMC Laboratory
Date of Receipt: Apr. 17, 2013
Date of Test: Apr. 17, 2013 ~ Jun. 24, 2013

Testing Engineer: Josh Lin
(Josh Lin)

Technical Manager: Jeff Yang
(Jeff Yang)

Authorized Signatory: Andy Chiu
(Andy Chiu)

Neutron Engineering Inc.

B1, No. 37, Lane 365, YangGuang St.,
NeiHu District 114, Taipei, Taiwan.

TEL: +886-2-2657-3299
FAX: +886-2-2657-3331





Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C.**, or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

Neutron's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **Neutron** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **Neutron** issued reports.

Neutron's reports must not be used by the client to claim product endorsement by the authorities or any agency of the Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and **Neutron-self**, extracts from the test report shall not be reproduced except in full with **Neutron's** authorized written approval.

Neutron's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.



Table of Contents

REPORT ISSUED HISTORY	6
1 CERTIFICATION	7
2 SUMMARY OF TEST RESULTS	8
2.1 TEST FACILITY	9
2.2 MEASUREMENT UNCERTAINTY	9
3 GENERAL INFORMATION	10
3.1 GENERAL DESCRIPTION OF EUT	10
3.2 DESCRIPTION OF TEST MODES	12
3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING	13
3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	14
3.5 DESCRIPTION OF SUPPORT UNITS	15
4 ANTENNA CONDUCTED SPURIOUS EMISSION	16
4.1 LIMIT	16
4.2 MEASUREMENT INSTRUMENTS LIST	16
4.3 TEST PROCEDURES	16
4.4 TEST SETUP LAYOUT	16
4.5 DEVIATION FROM TEST STANDARD	16
4.6 EUT OPERATING CONDITIONS	16
4.7 TEST RESULTS	17
5 HOPPING CHANNEL SEPARATION	25
5.1 LIMIT	25
5.2 MEASUREMENT INSTRUMENTS LIST	25
5.3 MEASURING INSTRUMENTS SETTING	25
5.4 TEST PROCEDURES	25
5.5 TEST SETUP LAYOUT	25
5.6 DEVIATION FROM TEST STANDARD	25
5.7 EUT OPERATING CONDITIONS	25
5.8 TEST RESULTS	26
6 MAXIMUM PEAK CONDUCTED OUTPUT POWER	34
6.1 LIMIT	34
6.2 MEASUREMENT INSTRUMENTS LIST	34
6.3 TEST PROCEDURES	34
6.4 TEST SETUP LAYOUT	34
6.5 DEVIATION FROM TEST STANDARD	34
6.6 EUT OPERATING CONDITIONS	34
6.7 TEST RESULTS	35
7 RADIATED SPURIOUS EMISSION (9 KHZ TO 1 GHZ)	39
7.1 LIMIT	39



Table of Contents

7.2	MEASUREMENT INSTRUMENTS LIST	40
7.3	MEASURING INSTRUMENTS SETTING	40
7.4	TEST PROCEDURES	41
7.5	DEVIATION FROM TEST STANDARD	41
7.6	TEST SETUP LAYOUT	41
7.7	EUT OPERATING CONDITIONS	42
7.8	TEST RESULTS	43
8	RADIATED SPURIOUS EMISSION (ABOVE 1 GHZ)	45
8.1	LIMIT	45
8.2	MEASUREMENT INSTRUMENTS LIST	46
8.3	MEASURING INSTRUMENTS SETTING	46
8.4	TEST PROCEDURES	47
8.5	DEVIATION FROM TEST STANDARD	47
8.6	TEST SETUP LAYOUT	47
8.7	EUT OPERATING CONDITIONS	48
8.8	TEST RESULTS	49
8.9	TEST RESULTS (RESTRICTED BANDS)	73
9	NUMBER OF HOPPING FREQUENCY	81
9.1	LIMIT	81
9.2	MEASUREMENT INSTRUMENTS LIST	81
9.3	MEASURING INSTRUMENTS SETTING	81
9.4	TEST PROCEDURES	81
9.5	TEST SETUP LAYOUT	81
9.6	DEVIATION FROM TEST STANDARD	81
9.7	EUT OPERATING CONDITIONS	81
9.8	TEST RESULTS	82
10	AVERAGE TIME OF OCCUPANCY	84
10.1	LIMIT	84
10.2	MEASUREMENT INSTRUMENTS LIST	84
10.3	TEST PROCEDURES	84
10.4	TEST SETUP LAYOUT	84
10.5	DEVIATION FROM TEST STANDARD	84
10.6	EUT OPERATING CONDITIONS	85
10.7	TEST RESULTS	86
11	RF EXPOSURE COMPLIANCE	98
11.1	LIMIT	98
11.2	MEASUREMENT INSTRUMENTS LIST	98
11.3	MPE CALCULATION METHOD	98



Table of Contents

11.4	TEST SETUP LAYOUT	99
11.5	DEVIATION FROM TEST STANDARD	99
11.6	EUT OPERATING CONDITIONS	99
11.7	TEST RESULTS	99
12	EUT TEST PHOTO	100



REPORT ISSUED HISTORY

Revised Version No.	Description	Issued Date
-	Initial Issue.	Jun. 26, 2013



1 CERTIFICATION

Equipment : RF Module
Brand Name : RIOTEC
Model Name : R8001
Applicant : RIOTEC Co., Ltd.
Date of Test : Apr. 17, 2013 ~ Jun. 24, 2013
Standards : FCC Part 15, Subpart C: 2012
ANSI C63.4: 2009

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCP-1-1304143) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

**2. SUMMARY OF TEST RESULTS**

Standard Clause	Test Item	Result
15.207	Conducted Emission	PASS
15.247 (c)	Antenna conducted Spurious Emission	PASS
15.247 (a)(1)	Hopping Channel Separation	PASS
15.247 (b)	Maximum Peak Conducted Output Power	PASS
15.247 (c)	Radiated Spurious Emission	PASS
15.247 (b)(1)	Number of Hopping Frequency	PASS
15.247 (a)(1)	Average time of occupancy	PASS
15.205	Restricted Bands	PASS
15.203	Antenna Requirement	PASS
1.1307 1.1310 2.1091 2.1093	RF Exposure Compliance	PASS

NOTE:

1. **N/A**: denotes test is not applicable in this Test Report
2. Portable device; SAR report is required.



2.1 TEST FACILITY

The test facilities used to collect the test data in this report:

Conducted emission Test:

C01: (VCCI RN: C-2918; FCC RN: 95335; FCC DN: TW1010)
No.132-1, Ln. 329, Sec. 2, Balian Rd., Xizhi Dist., New Taipei City 221, Taiwan
(R.O.C.)

Radiated emission Test (Below 1 GHz):

CB08: (FCC RN: 614388; FCC DN: TW1054; IC Assigned Code: 4428C-1)
1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

Radiated emission Test (Above 1 GHz):

CB08: (VCCI RN: G-91; FCC RN: 614388; FCC DN: TW1054; IC Assigned Code: 4428C-1)
1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty is not specified by FCC rules and for reference only.

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2.

A. Conducted emission test:

Test Site	Measurement Frequency Range	U , (dB)	NOTE
C01	150 kHz ~ 30 MHz	1.94	

B. Radiated emission test:

Test Site	Item	Measurement Frequency Range	Uncertainty	NOTE
CB08	Radiated emission at 3m	Horizontal Polarization	30 - 200MHz	3.35 dB
			200 - 1000MHz	3.11 dB
			1 - 18GHz	3.97 dB
			18 - 40GHz	4.01 dB
	Vertical Polarization		30 - 200MHz	3.22 dB
			200 - 1000MHz	3.24 dB
			1 - 18GHz	4.05 dB
			18 - 40GHz	4.04 dB

Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our U_{lab} values in CISPR 16-4-2 terminology.

Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called U_{CISPR} , as follows:

Conducted Disturbance (mains port) – 150 kHz – 30 MHz : 3.6 dB

Radiated Disturbance (electric field strength on an open area test site or alternative test site) – 30 MHz – 1000 MHz : 5.2 dB

It can be seen that our U_{lab} values are smaller than U_{CISPR} .



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	RF Module	
Brand Name	RIOTEC	
Model Name	R8001	
OEM Brand/Model Name	N/A	
Model Difference	N/A	
Product Description	The EUT is a RF Module.	
	Operation Frequency	2402 MHz ~ 2480 MHz
	Modulation Type	FHSS(GFSK, pi/4 DQPSK, 8DPSK)
	Bit Rate of Transmitter	1, 2, 3 Mbps
	Number Of Channel	Please refer to the Note 2.
	Antenna Designation	Please refer to the Note 3.
	Antenna Gain(Peak)	Please refer to the Note 3.
	Maximum Conducted Output Power	Peak Output Power: 1 Mbps: -0.27 dBm 3 Mbps: -7.33 dBm
	More details of EUT technical specification, please refer to the User's Manual.	
Power Source	DC Voltage supplied from DC Source.	
Power Rating	I/P: DC 3.3V	
Connecting I/O Port(s)	Please refer to the User's Manual	
Products Covered	N/A	
EUT Modification(s)	N/A	



NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	YAGEO	CAN4311115002451K	Chip	N/A	4.10



3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Items	Mode	Data Rate	Tested Channel/Mode
Conducted Emission	GFSK	1 Mbps	2441 MHz
Antenna conducted Spurious Emission	GFSK	1 Mbps	2402 MHz, 2441 MHz, 2480 MHz
	8DPSK	3 Mbps	
Hopping Channel Separation	GFSK	1 Mbps	2402 MHz, 2441 MHz, 2480 MHz
	8DPSK	3 Mbps	
Maximum Peak Conducted Output Power	GFSK	1 Mbps	2402 MHz, 2441 MHz, 2480 MHz
	8DPSK	3 Mbps	
Radiated Spurious Emission (30 MHz to 1 GHz)	GFSK	1 Mbps	2441 MHz
Radiated Spurious Emission (above 1 GHz)	GFSK	1 Mbps	2402 MHz, 2441 MHz, 2480 MHz
	8DPSK	3 Mbps	
Number of Hopping Frequency	GFSK	1 Mbps	2402 MHz, 2441 MHz, 2480 MHz
	8DPSK	3 Mbps	
Average time of occupancy	GFSK	1 Mbps	2402 MHz, 2441 MHz, 2480 MHz
	8DPSK	3 Mbps	
Restricted Bands	GFSK	1 Mbps	2402 MHz, 2441 MHz, 2480 MHz
	8DPSK	3 Mbps	
Antenna Requirement	GFSK	---	---
RF Exposure Compliance	GFSK	---	---

NOTE: The measurements are performed at the highest, middle, lowest available channels.



3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

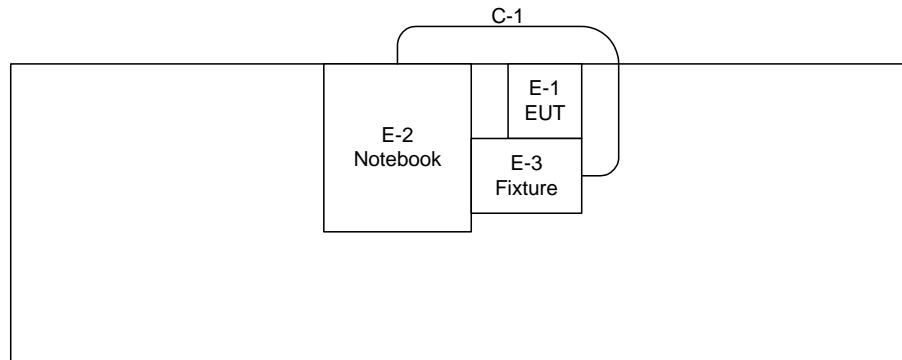
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Data Rate	1 Mbps		
Test software Version	Bluetest3		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameter	50	50	50

Data Rate	3 Mbps		
Test software Version	Bluetest3		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameter	82	76	76



3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



C-1 RS232 Cable



3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	RF Module	RIOTEC	R8001	V3DR8001	N/A	EUT
E-2	Notebook PC	DELL	D602	DOC	PF329 A01	
E-3	Fixture	N/A	N/A	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	NO	1.5M	

NOTE: The support equipment was authorized by Declaration of Conformity (DOC).



4 ANTENNA CONDUCTED SPURIOUS EMISSION

4.1 LIMIT

Test Item	Frequency Range (MHz)	Limit
Antenna conducted Spurious Emission	30-25000	20 dB less than the peak value of fundamental frequency

4.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 01, 2013

NOTE: **N/A**: denotes No Model Name, No Serial No. or No Calibration specified.

4.3 TEST PROCEDURES

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

4.4 TEST SETUP LAYOUT



4.5 DEVIATION FROM TEST STANDARD

No deviation

4.6 EUT OPERATING CONDITIONS

The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



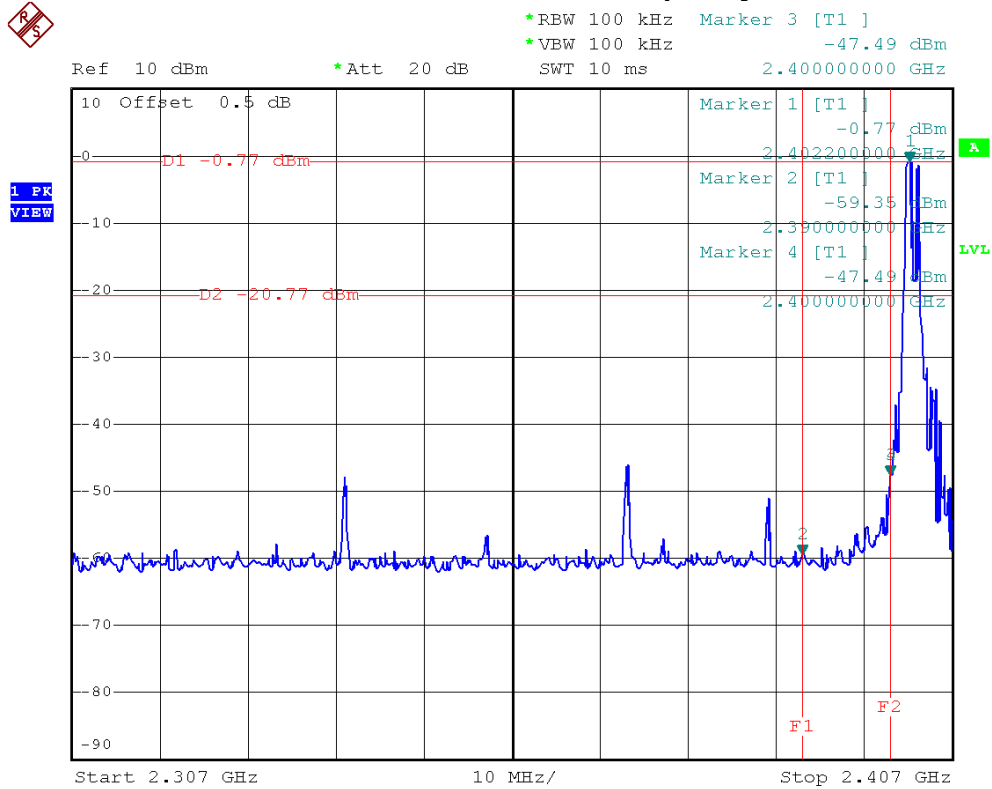
4.7 TEST RESULTS

E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps		

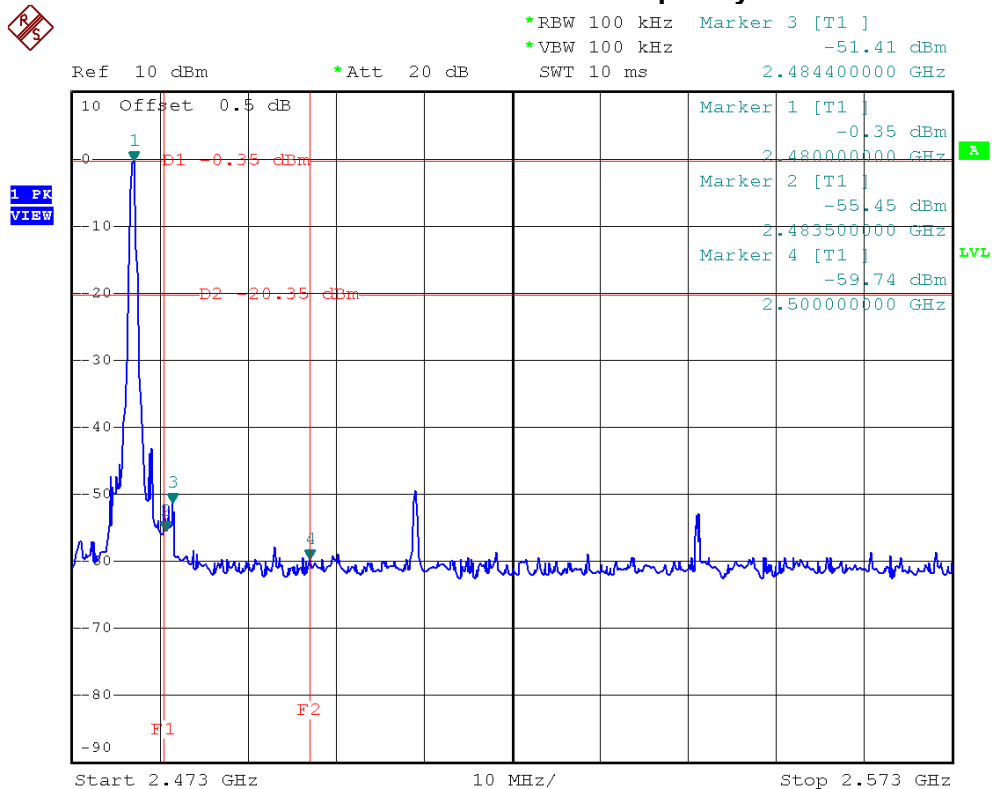
Channel of Worst Data			
The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2400.00	-47.49	2484.40	-51.41
Result			
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.			



Bluetooth/1 Mbps/The max. radio frequency power in any 100kHz bandwidth outside the frequency band

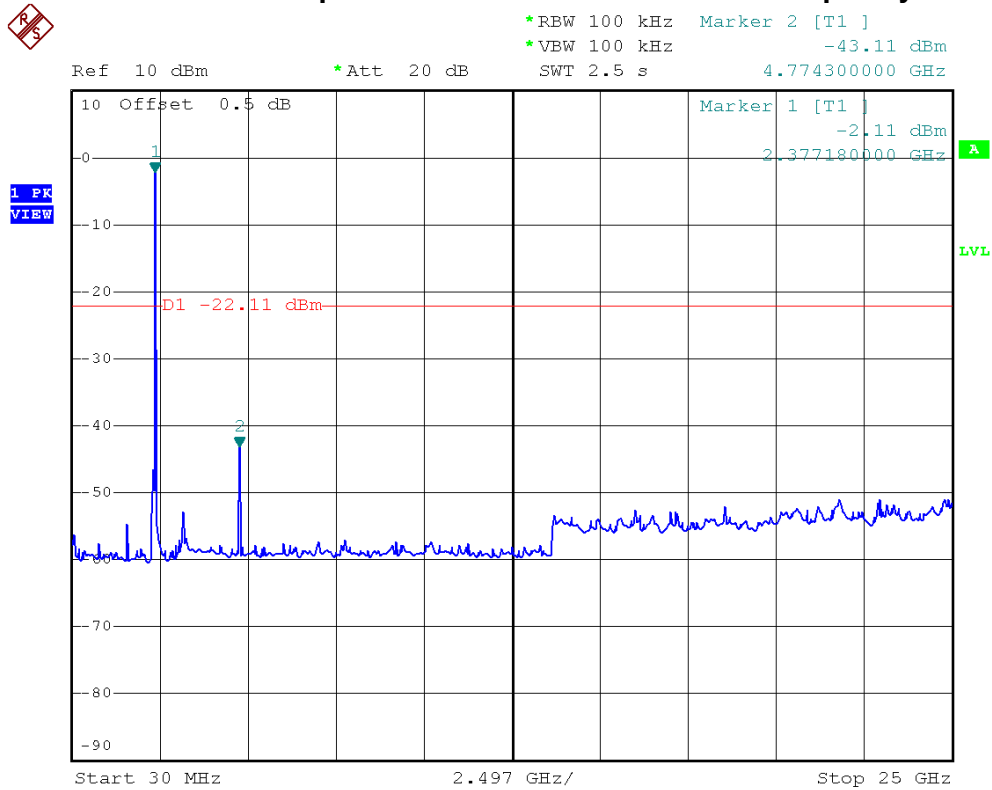


Bluetooth/1 Mbps/The max. radio frequency power in any 100 kHz bandwidth within the frequency band

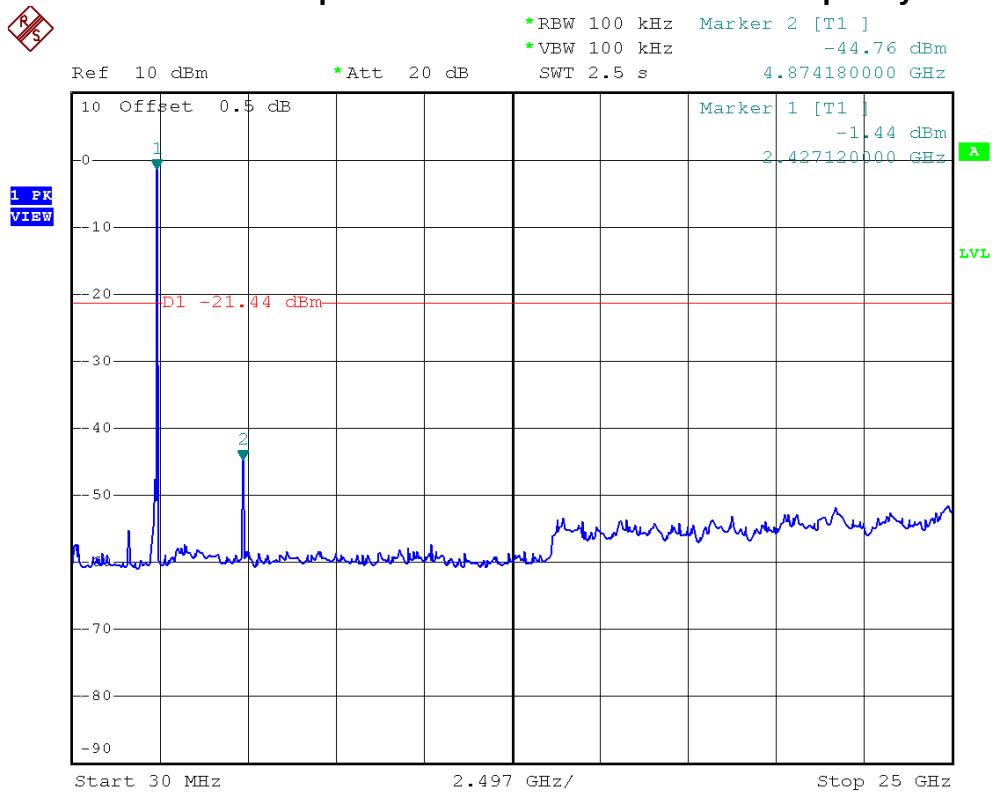




Bluetooth/1 Mbps/2402 MHz/10 Harmonic of the frequency



Bluetooth/1 Mbps/2441 MHz/10 Harmonic of the frequency

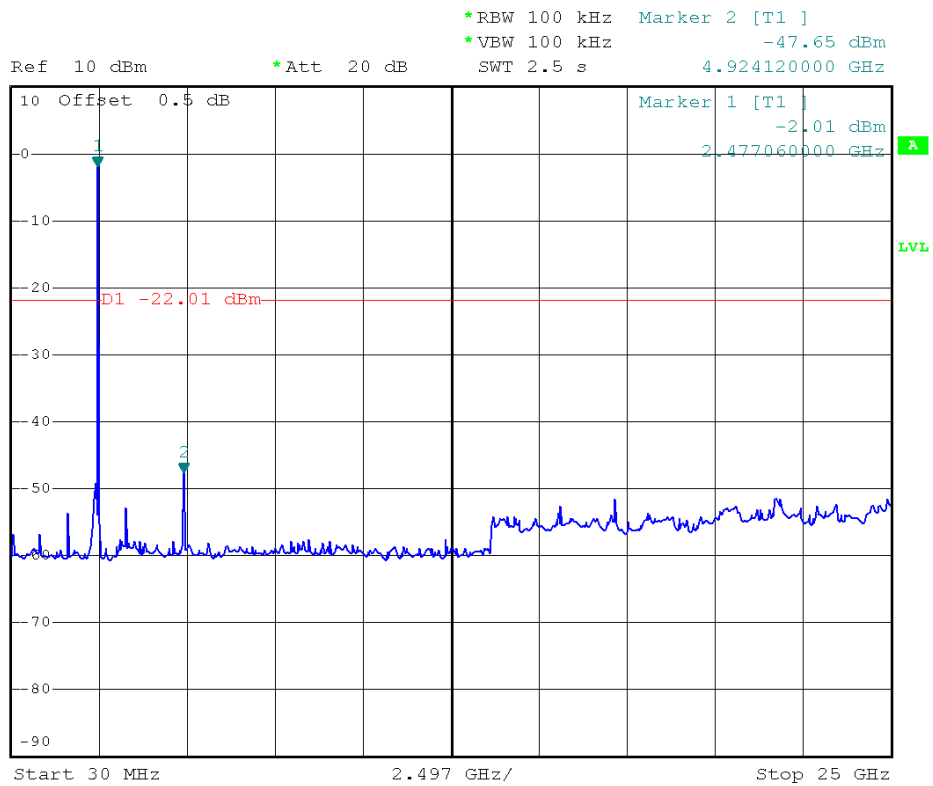




Bluetooth/1 Mbps/2480 MHz/10 Harmonic of the frequency



1 PK
VIEW



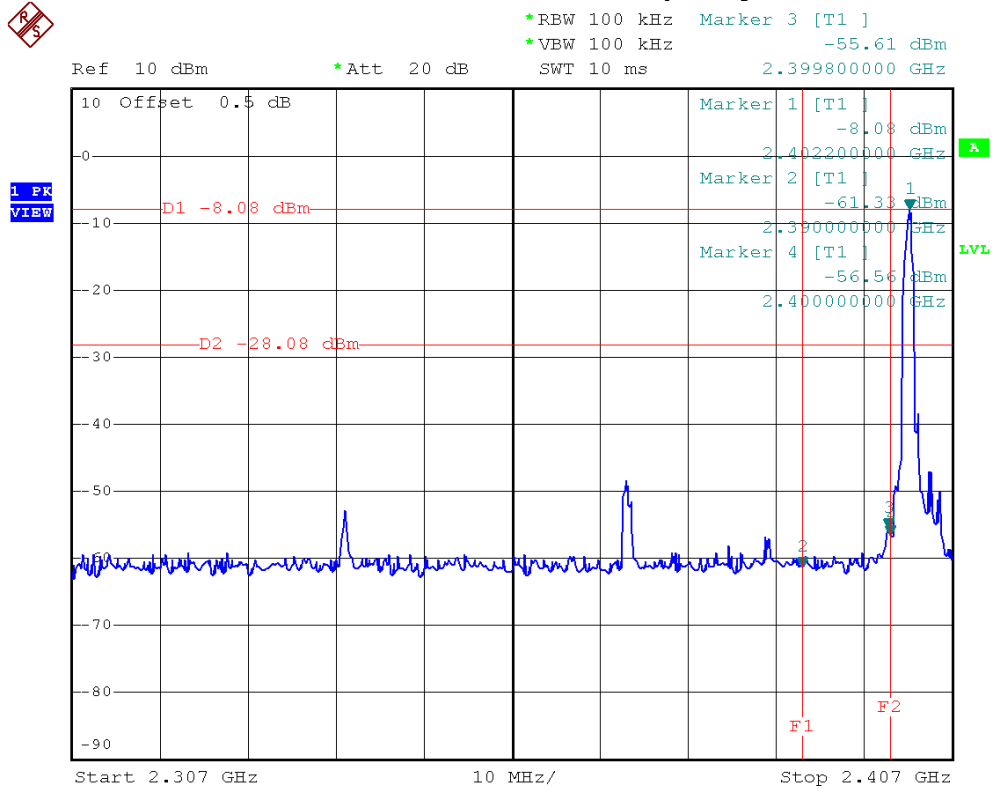


E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps		

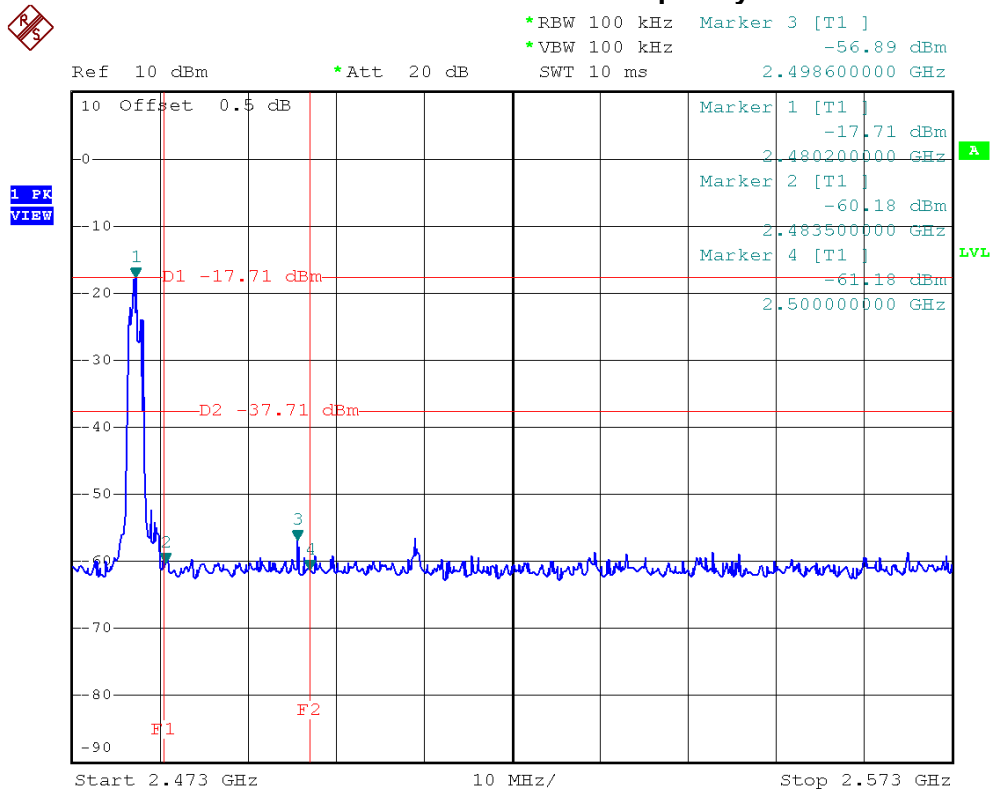
Channel of Worst Data			
The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2399.80	-55.61	2498.60	-56.89
Result			
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.			



Bluetooth/3 Mbps/The max. radio frequency power in any 100kHz bandwidth outside the frequency band

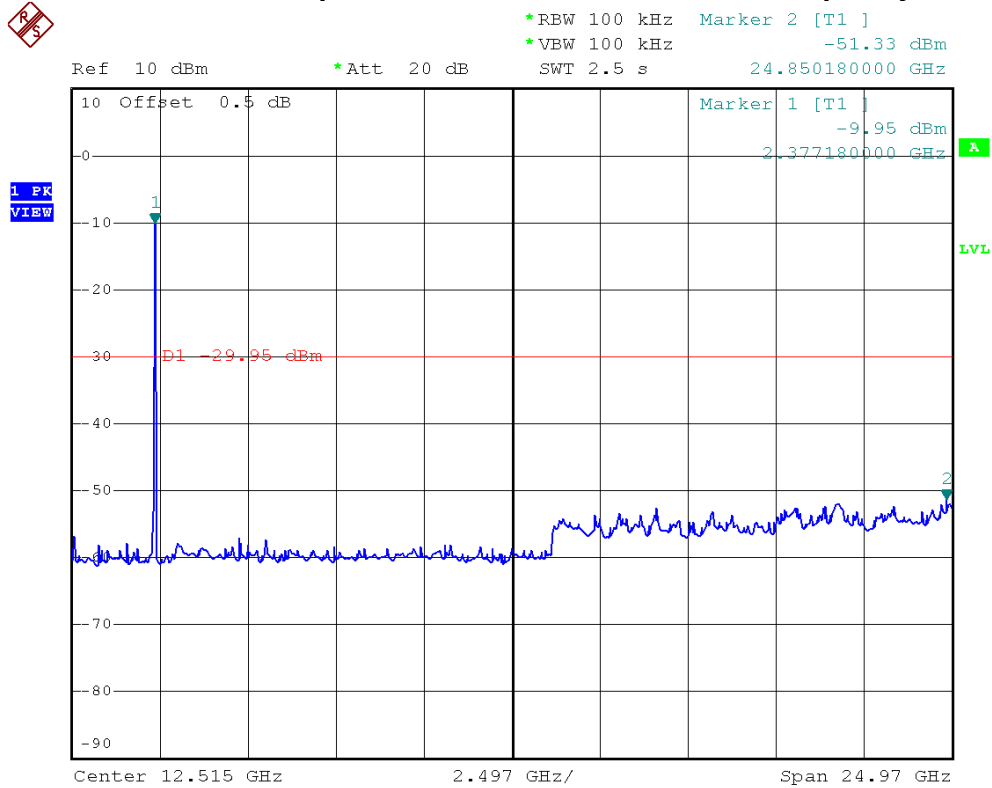


Bluetooth/3 Mbps/The max. radio frequency power in any 100 kHz bandwidth within the frequency band

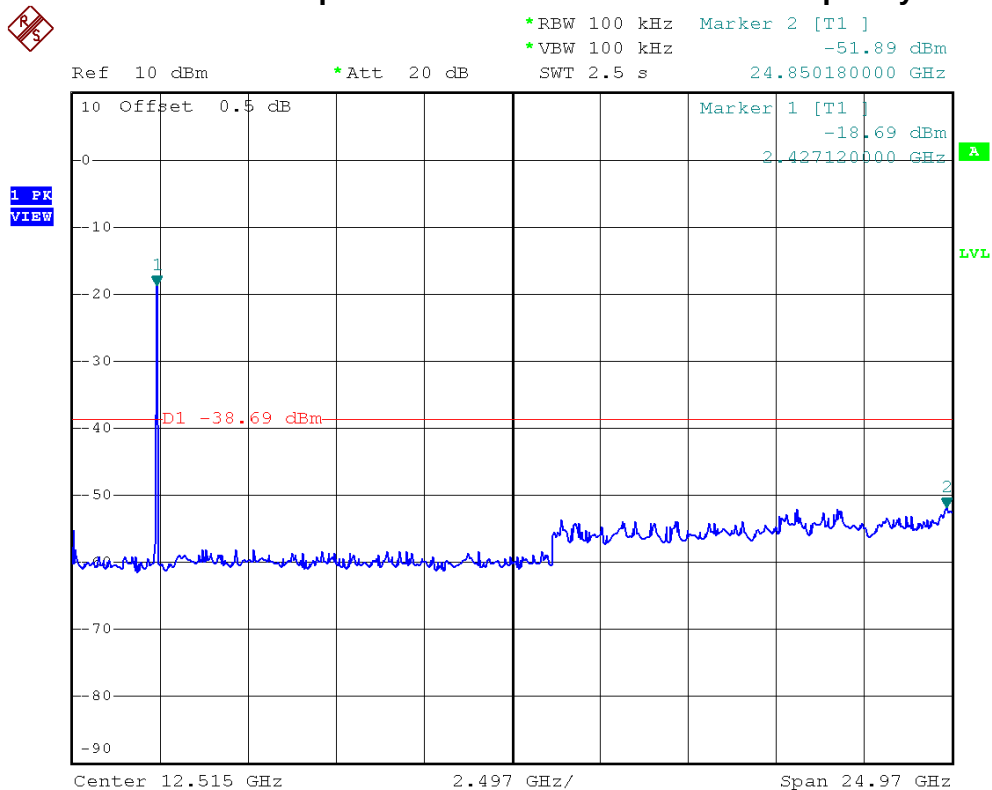




Bluetooth/3 Mbps/2402 MHz/10 Harmonic of the frequency



Bluetooth/3 Mbps/2441 MHz/10 Harmonic of the frequency

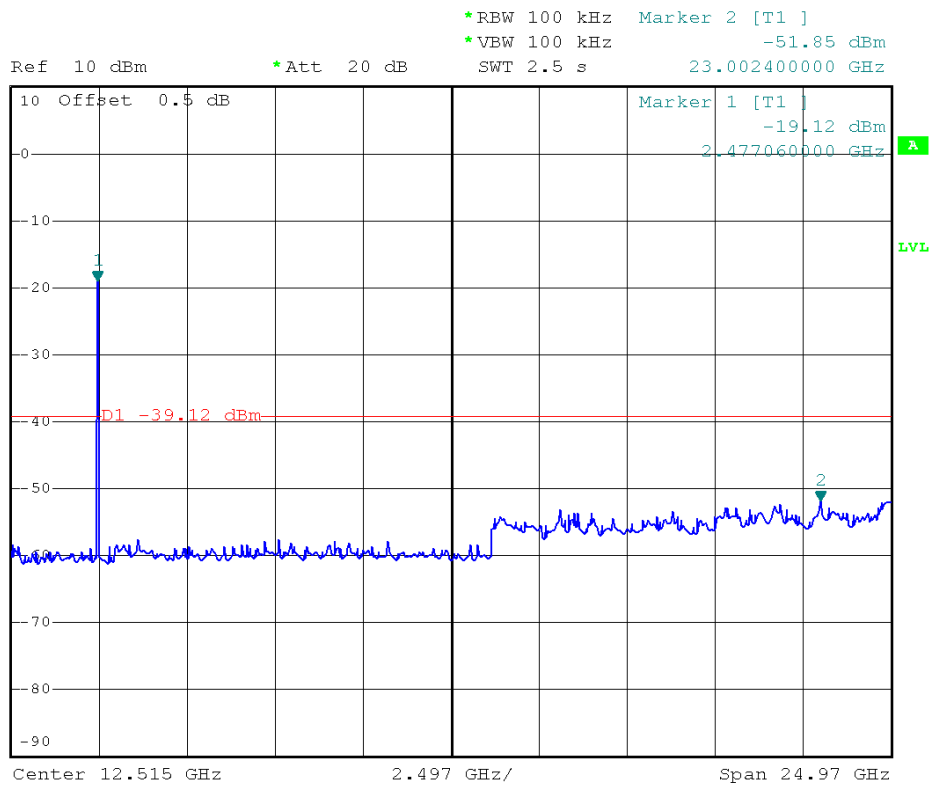




Bluetooth/3 Mbps/2480 MHz/10 Harmonic of the frequency



1 PK
VIEW





5 HOPPING CHANNEL SEPARATION

5.1 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.

5.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 01, 2013

NOTE: **N/A**: denotes No Model Name, No Serial No. or No Calibration specified.

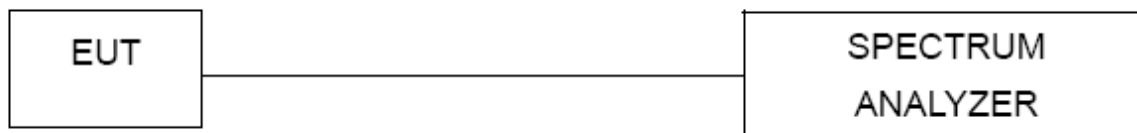
5.3 MEASURING INSTRUMENTS SETTING

EMI Test Receiver	Parameter Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.4 TEST PROCEDURES

- The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

5.5 TEST SETUP LAYOUT



5.6 DEVIATION FROM TEST STANDARD

No deviation

5.7 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

**5.8 TEST RESULTS**

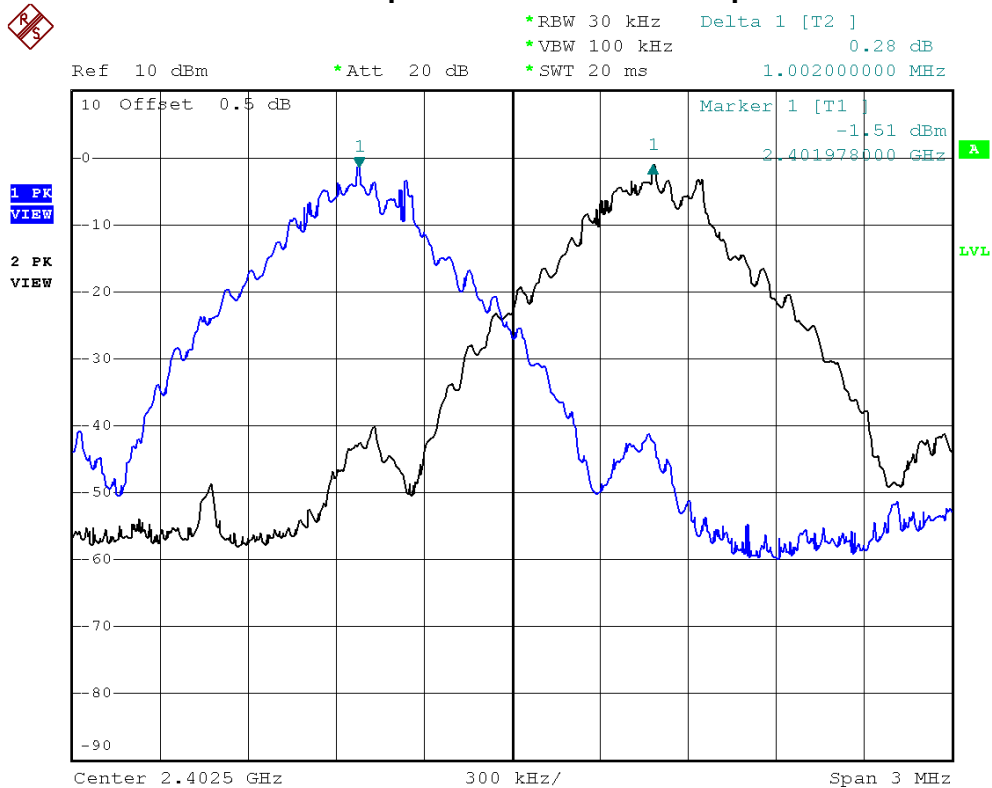
E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2402 MHz, 2441 MHz, 2480 MHz		

Frequency	Channel Separation (MHz)	20 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Two-thirds of the 20 dB Bandwidth	Result
2402 MHz	1.00	0.934	0.880	0.623	PASS
2441 MHz	1.01	0.946	0.888	0.631	PASS
2480 MHz	1.00	1.026	0.900	0.684	PASS

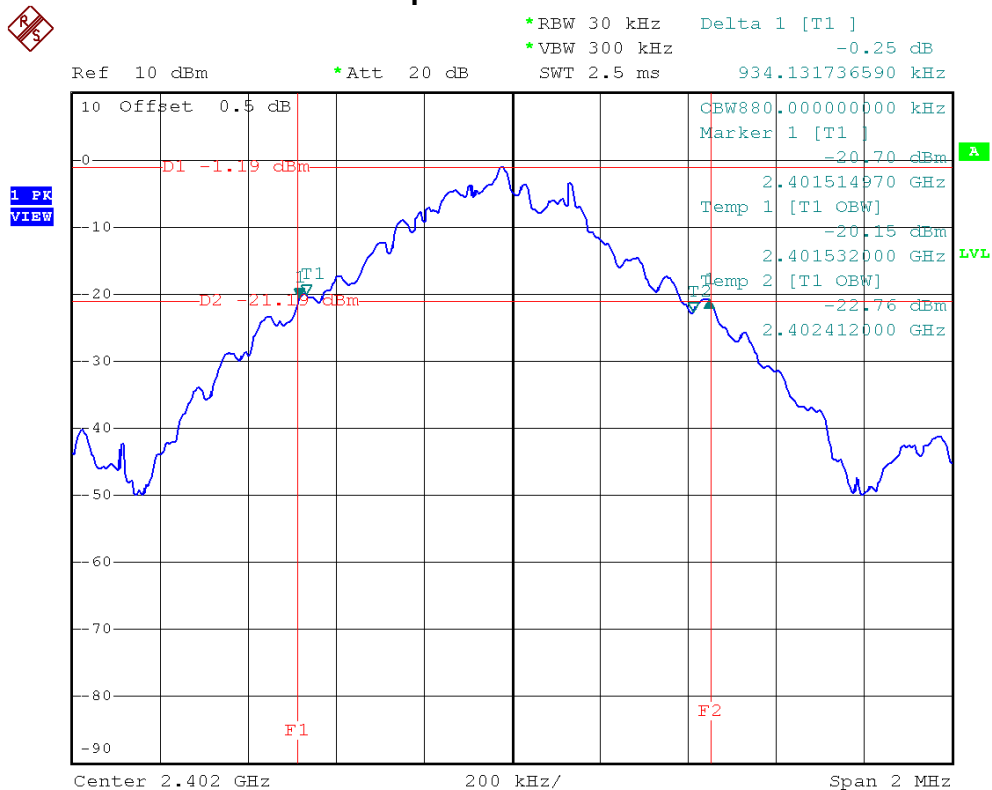
NOTE: Ch. Separation Limits: >25 KHz or >2/3 of 20dB bandwidth



Bluetooth/1 Mbps/2402 MHz/Channel Separation

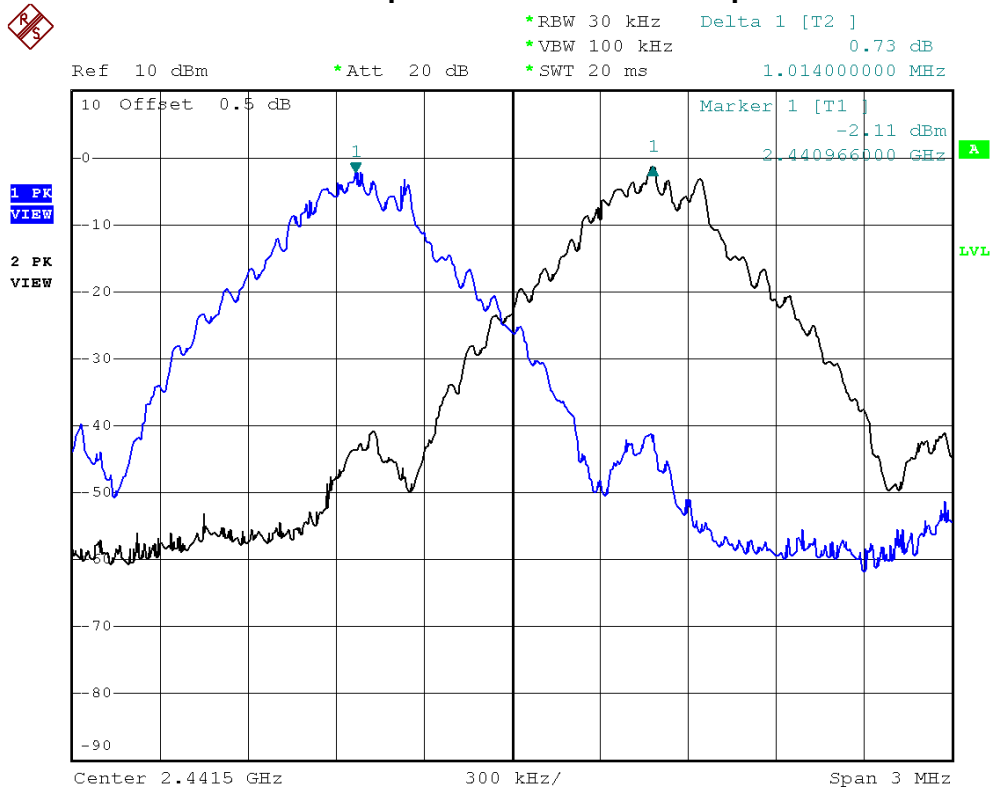


Bluetooth/1 Mbps/2402 MHz/20dB Bandwidth

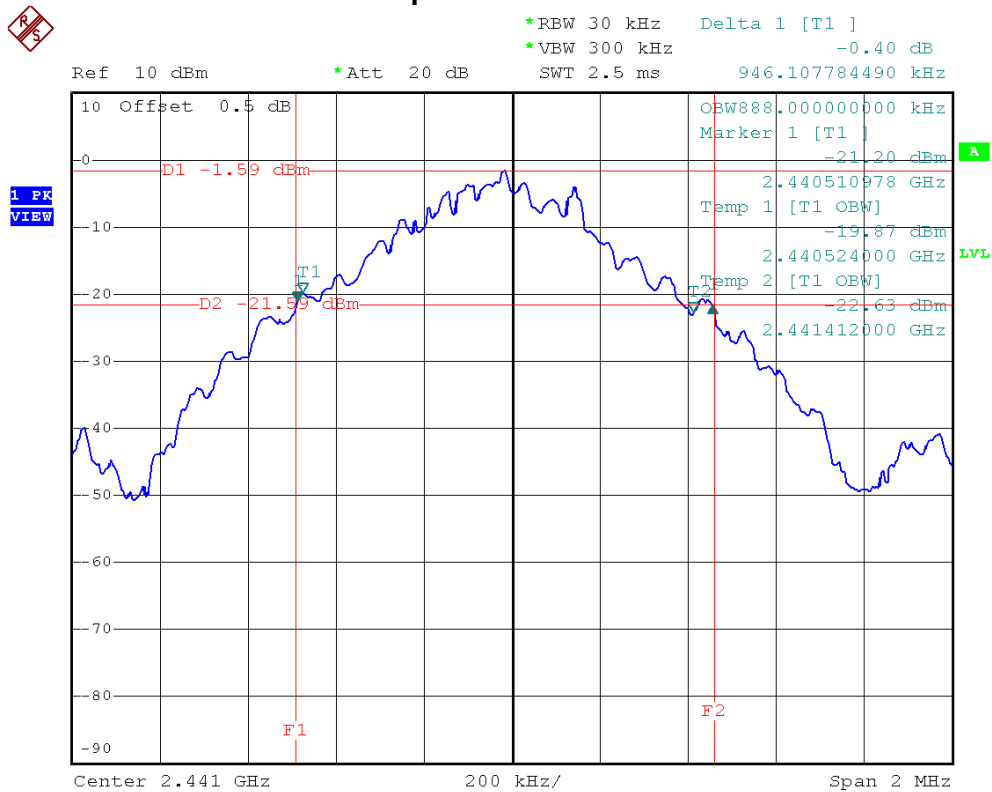




Bluetooth/1 Mbps/2441 MHz/Channel Separation

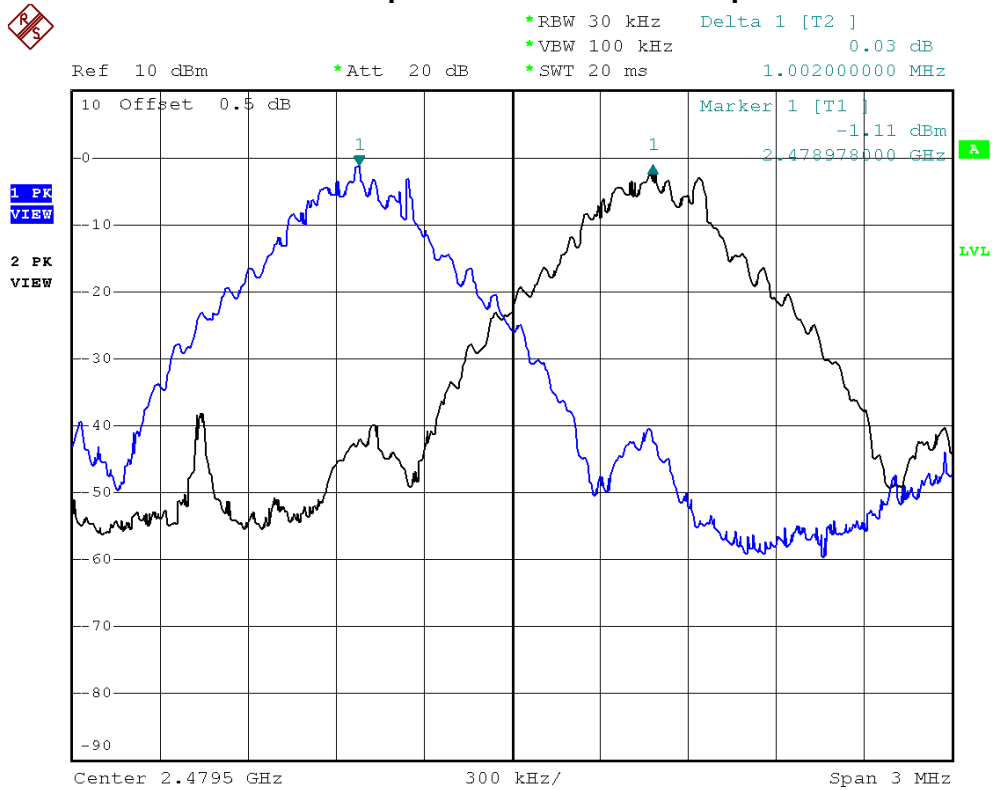


Bluetooth/1 Mbps/2441 MHz/20dB Bandwidth

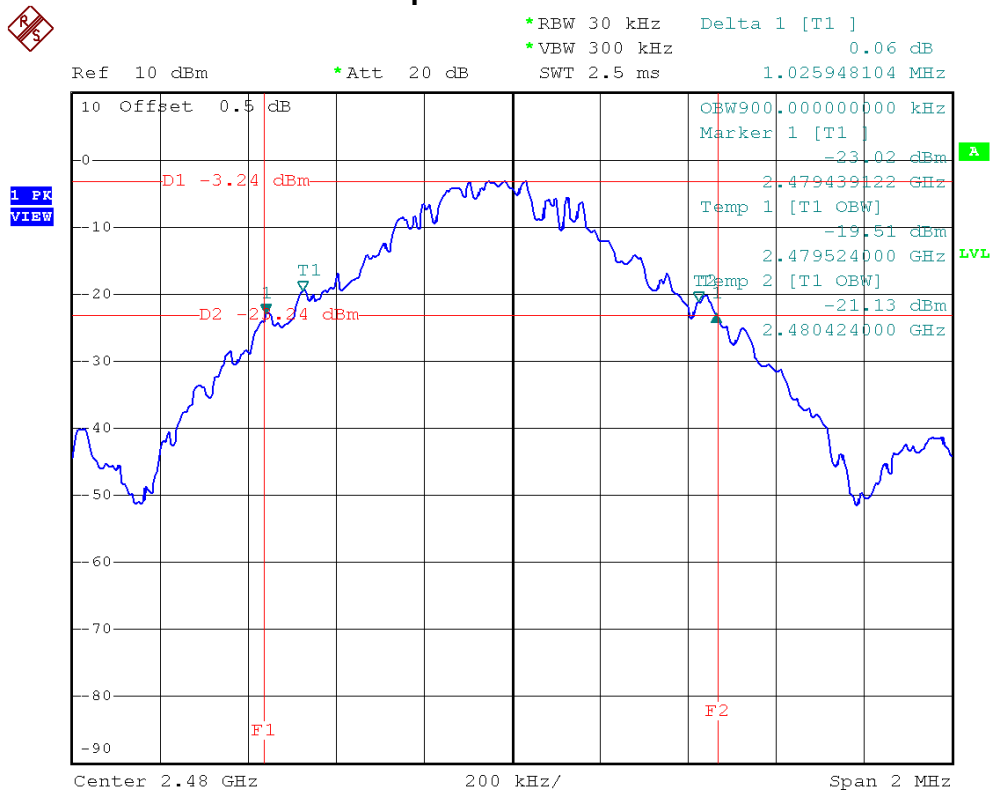




Bluetooth/1 Mbps/2480 MHz/Channel Separation



Bluetooth/1 Mbps/2480 MHz/20dB Bandwidth





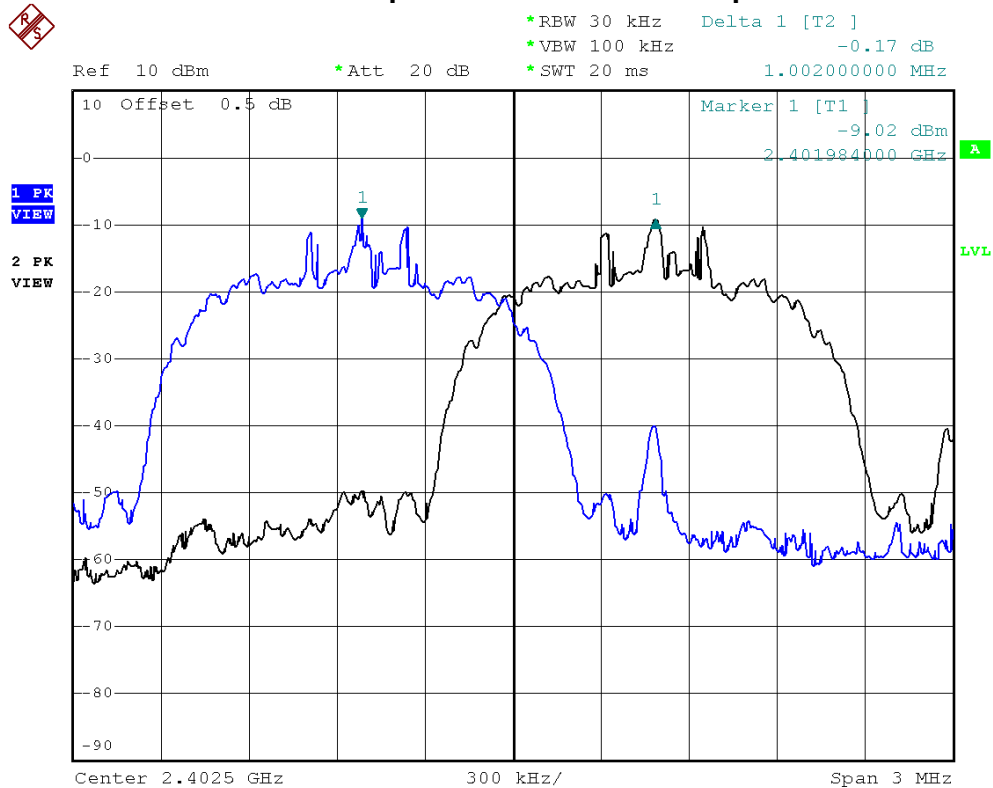
E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2402 MHz, 2441 MHz, 2480 MHz		

Frequency	Channel Separation (MHz)	20 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Two-thirds of the 20 dB Bandwidth	Result
2402 MHz	1.00	1.253	1.180	0.835	PASS
2441 MHz	0.99	1.257	1.192	0.838	PASS
2480 MHz	1.00	1.250	1.180	0.833	PASS

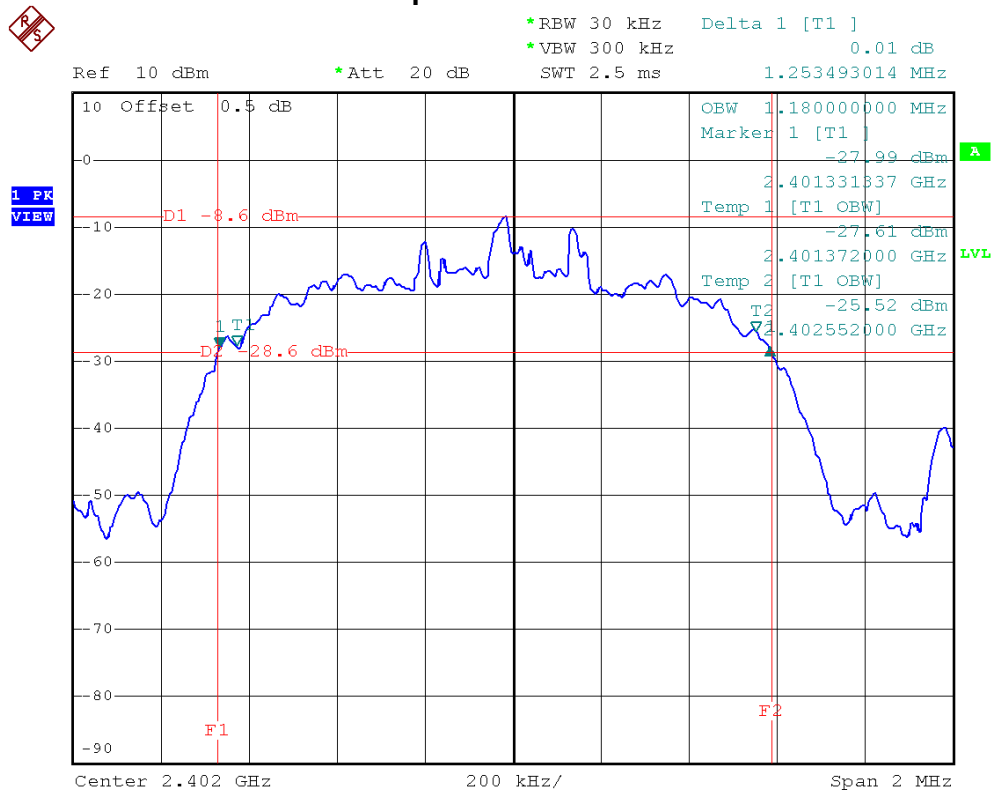
NOTE: Ch. Separation Limits: >25 KHz or >2/3 of 20dB bandwidth



Bluetooth/3 Mbps/2402 MHz/Channel Separation

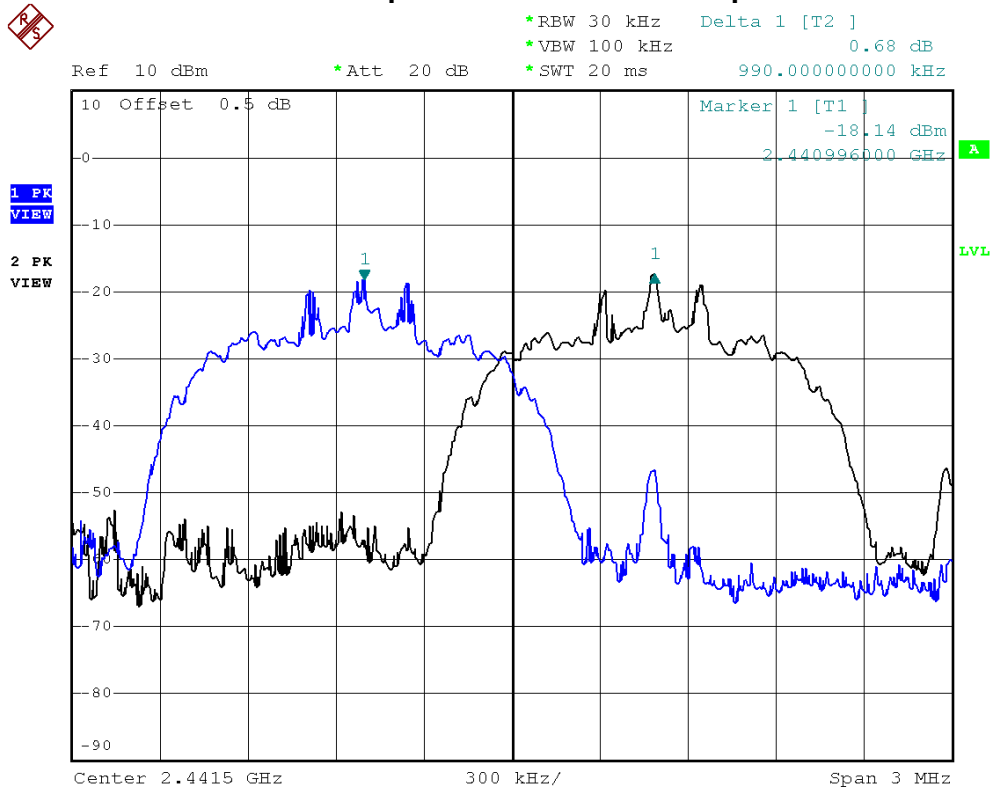


Bluetooth/3 Mbps/2402 MHz/20dB Bandwidth

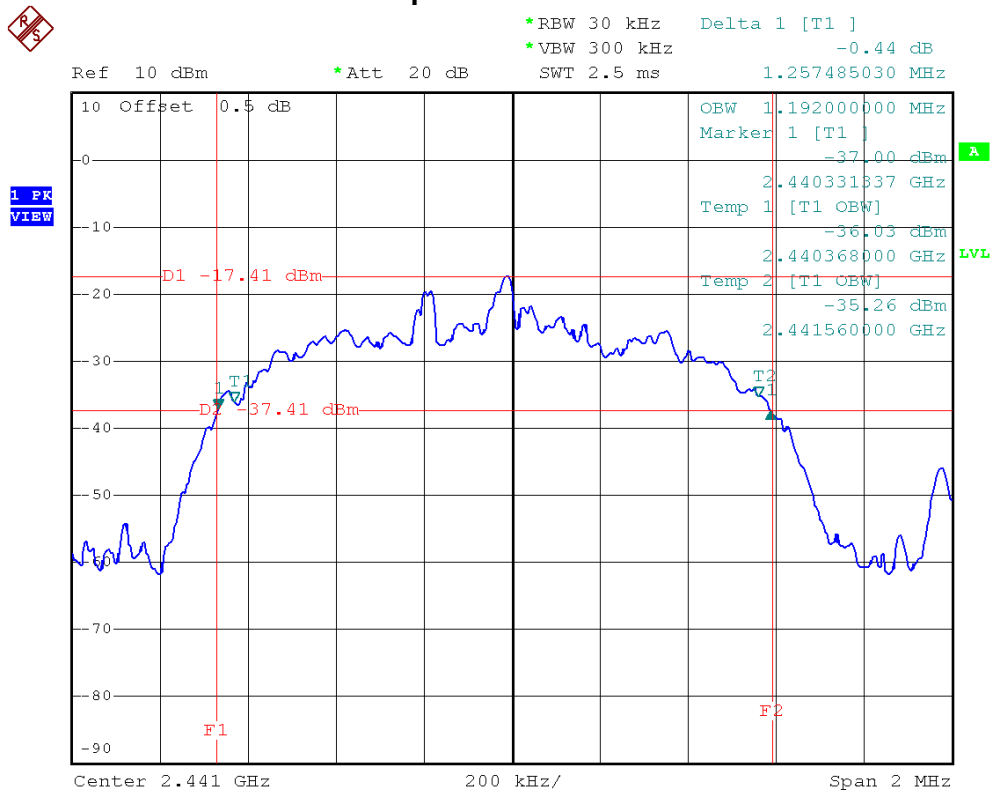




Bluetooth/3 Mbps/2441 MHz/Channel Separation

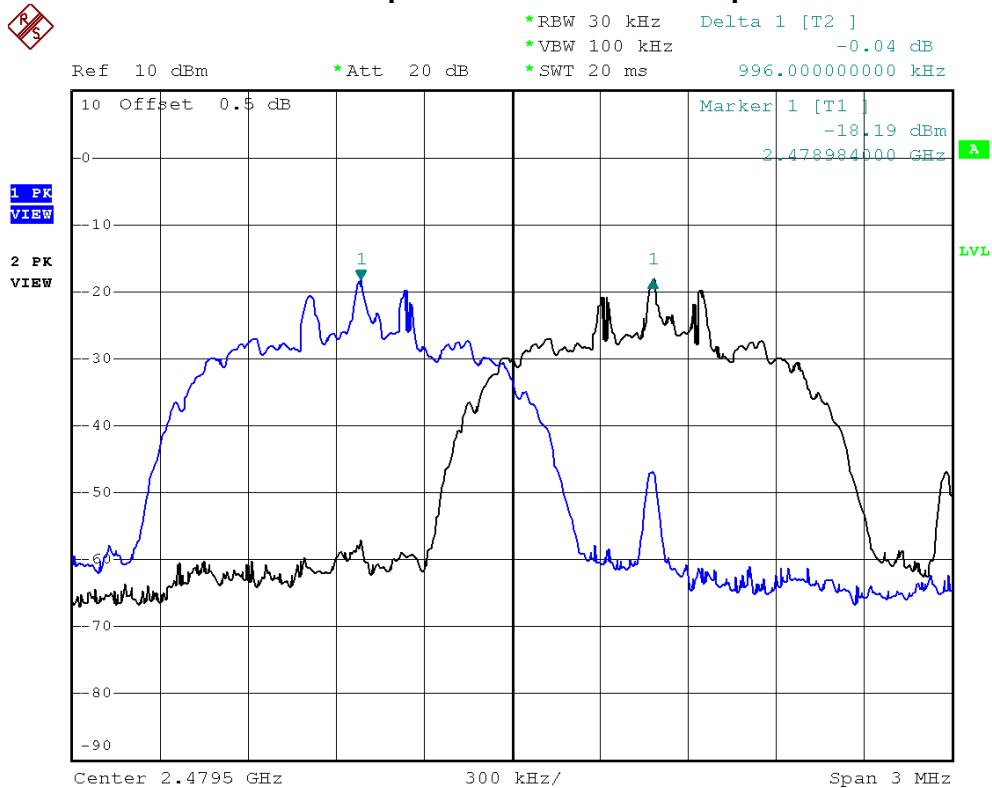


Bluetooth/3 Mbps/2441 MHz/20dB Bandwidth

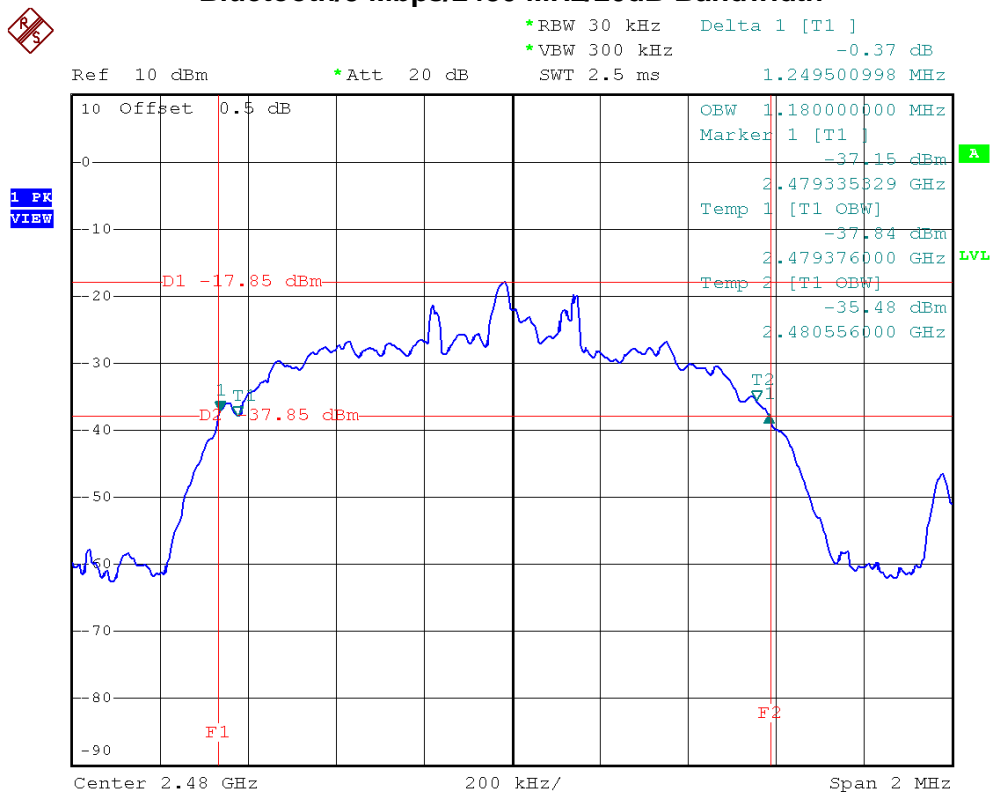




Bluetooth/3 Mbps/2480 MHz/Channel Separation



Bluetooth/3 Mbps/2480 MHz/20dB Bandwidth





6 MAXIMUM PEAK CONDUCTED OUTPUT POWER

6.1 LIMIT

Test Item	Frequency Range (MHz)	Limit
Maximum Peak Conducted Output Power	2400-2483.5	1 watt or 30 dBm

6.2 MEASUREMENT INSTRUMENTS LIST

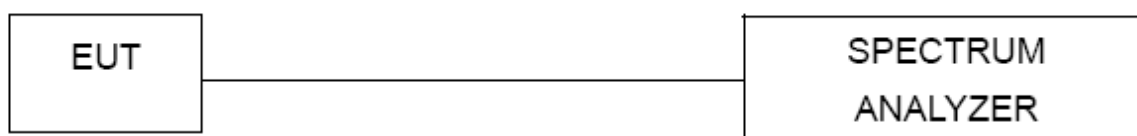
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 01, 2013

NOTE: **N/A**: denotes No Model Name, No Serial No. or No Calibration specified.

6.3 TEST PROCEDURES

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW= 3 MHz, VBW= 3 MHz, Sweep time = Auto.

6.4 TEST SETUP LAYOUT



6.5 DEVIATION FROM TEST STANDARD

No deviation

6.6 EUT OPERATING CONDITIONS

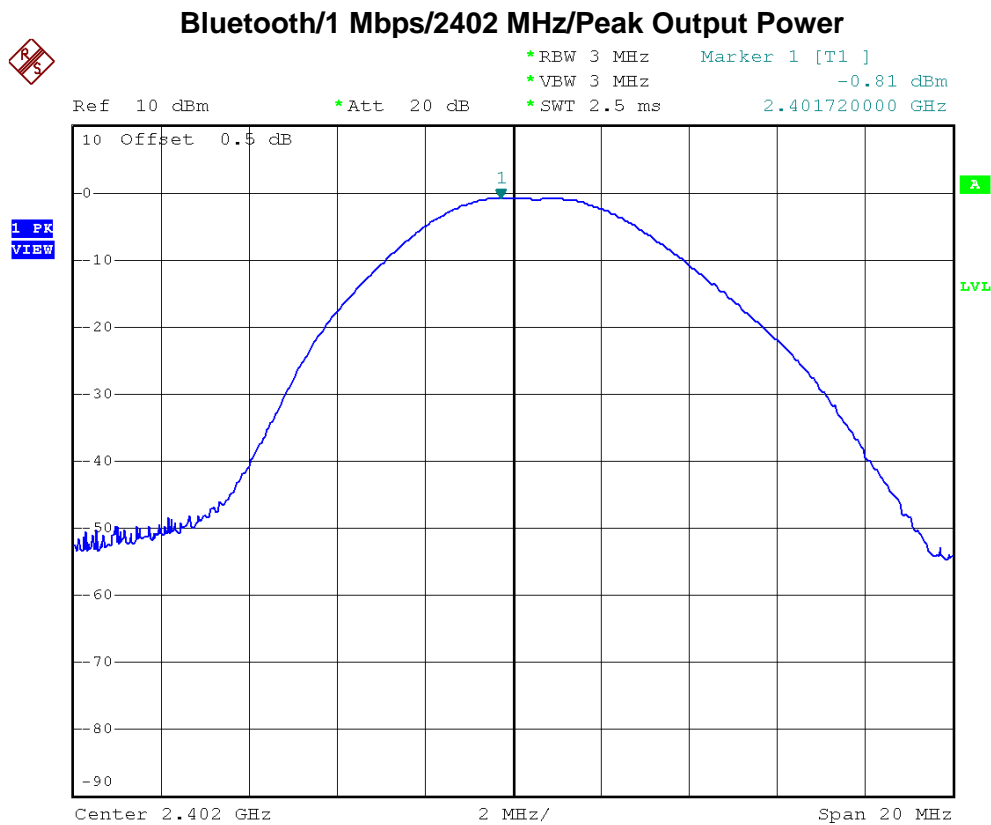
The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.



6.7 TEST RESULTS

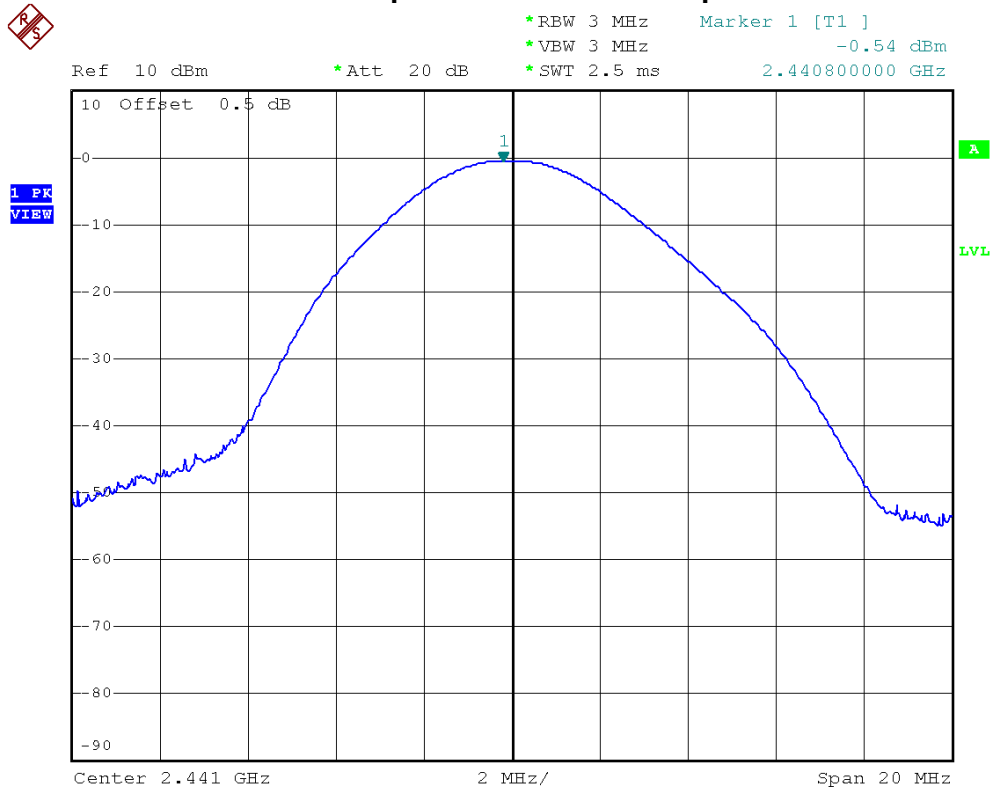
E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2402 MHz, 2441 MHz, 2480 MHz		

Frequency	Peak Output Power (dBm)	LIMIT (dBm)	Result
2402 MHz	-0.81	30	PASS
2441 MHz	-0.54	30	PASS
2480 MHz	-0.27	30	PASS

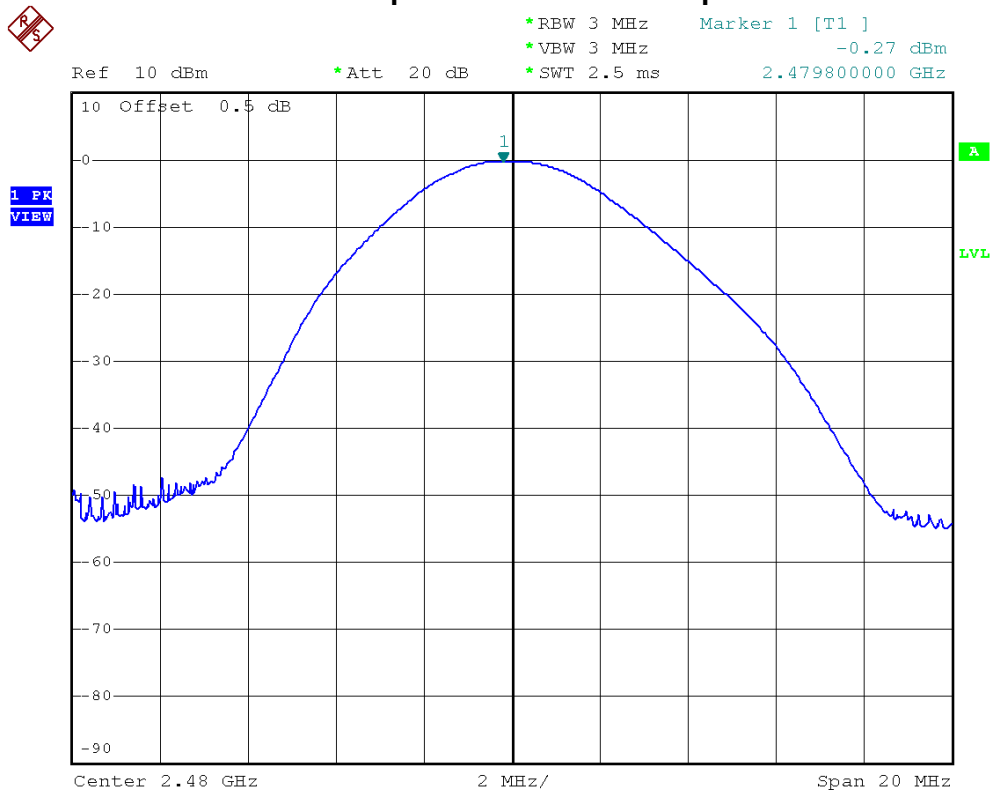




Bluetooth/1 Mbps/2441 MHz/Peak Output Power



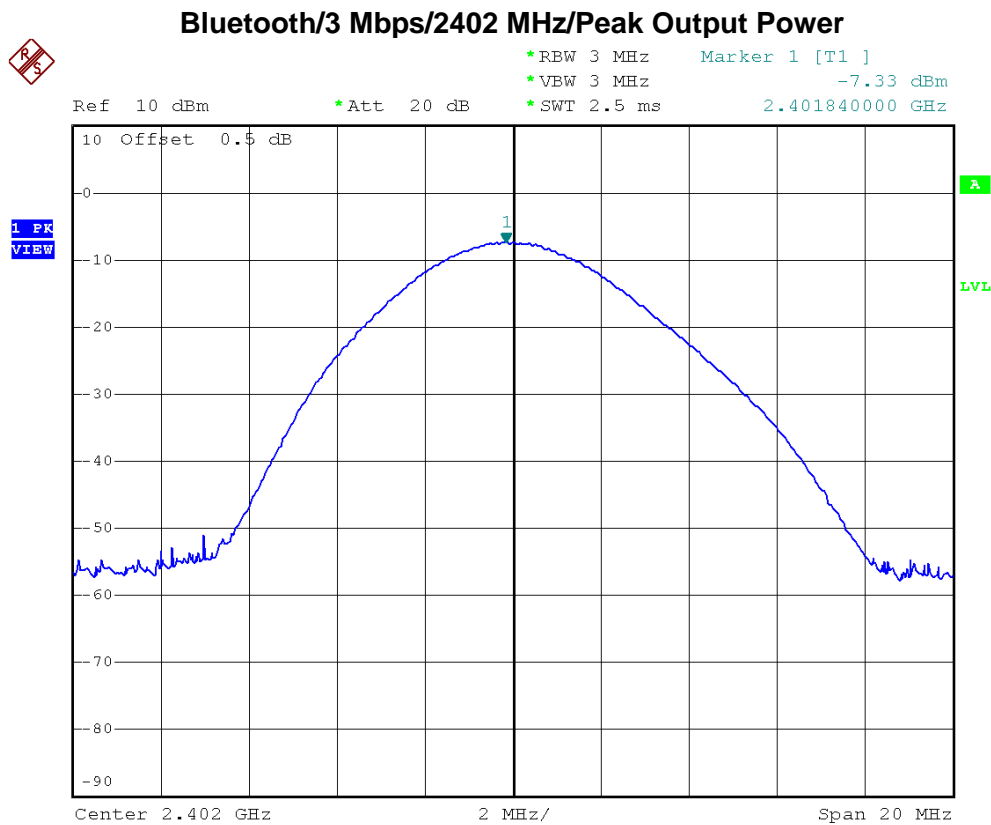
Bluetooth/1 Mbps/2480 MHz/Peak Output Power





E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2402 MHz, 2441 MHz, 2480 MHz		

Frequency	Peak Output Power (dBm)	LIMIT (dBm)	Result
2402 MHz	-7.33	30	PASS
2441 MHz	-15.39	30	PASS
2480 MHz	-16.75	30	PASS

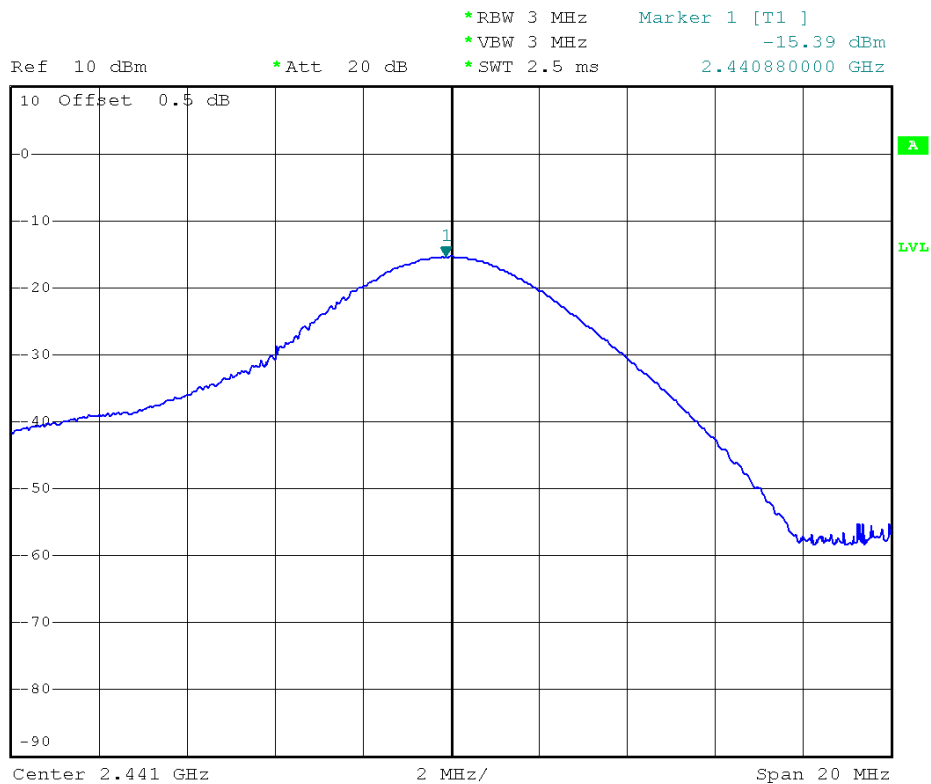




Bluetooth/3 Mbps/2441 MHz/Peak Output Power



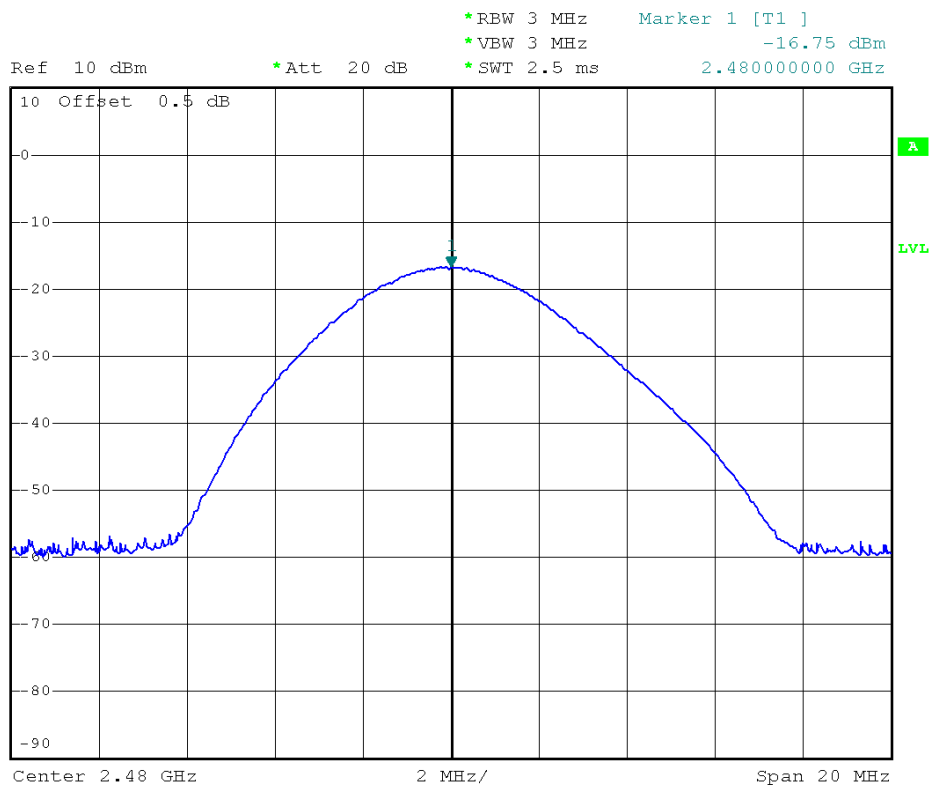
1 PK
VIEW



Bluetooth/3 Mbps/2480 MHz/Peak Output Power



1 PK
VIEW





7 RADIATED SPURIOUS EMISSION (9 KHZ TO 1 GHZ)

7.1 LIMIT

20 dB in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency Range: 9 kHz to 1 GHz		
FREQUENCY (MHz)	Field Strength (micровolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Frequency Range: above 1 GHz				
FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
above 1 GHz	80	60	74	54

NOTE:

- (1) The limit for radiated test was performed according to FCC PART 15B.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain(if use)
 Margin Level = Measurement Value – Limit Value



7.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 01, 2013
2	Horn Antenna	Schwarzbeck	BBHA 9120	D-325	Apr. 15, 2014
3	Microwave Pre_amplifier	Agilent	8449B	3008A01714	Apr. 16, 2014
4	Microflex Cable	N/A	N/A	1m	Apr. 13, 2014
5	Microflex Cable	AISI	S104-SMAP-1	10m	Apr. 13, 2014
6	Microflex Cable	N/A	N/A	3m	Apr. 13, 2014
7	Test Cable	N/A	LMR-400	966_12m	May. 14, 2014
8	Test Cable	N/A	LMR-400	966_3m	May. 14, 2014
9	Pre-Amplifier	EMC	EMC-330	980001	May. 30, 2014
10	Log-Bicon Antenna	Schwarzbeck	VULB9168-352	9168-352	Jun. 11, 2014

Remark: "N/A" denotes No Model Name, No Serial No. or No Calibration specified.

7.3 MEASURING INSTRUMENTS SETTING

EMI Test Receiver	Parameter Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP



7.4 TEST PROCEDURES

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1 GHz. For frequencies above 1 GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m Semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.
- The testing follows the guidelines in ANSI C63.4 and FCC Public Notice DA 00-705 Measurement Guidelines. In case the emission is fail due to the used RBW/VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

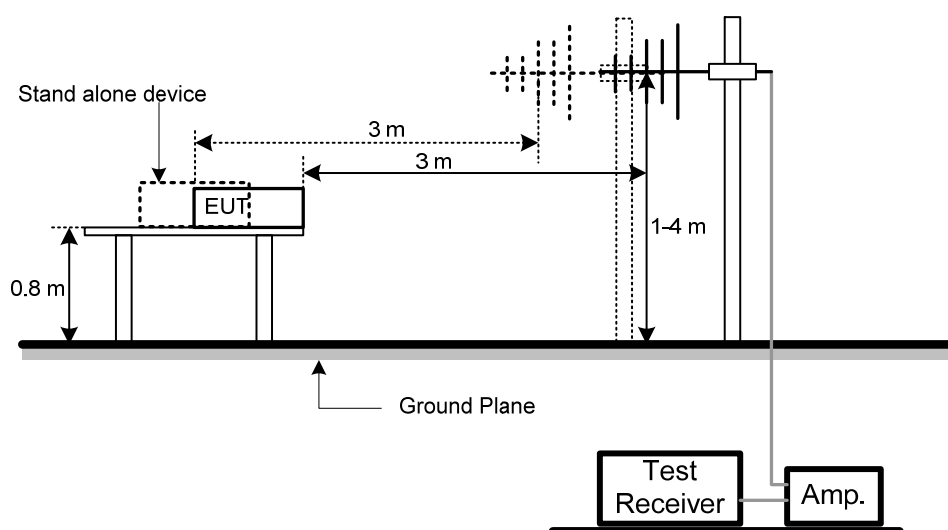
NOTE:

- Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode with Detector BW=120 kHz; SPA setting in RBW=100 kHz, VBW =100 kHz, Swp. Time = 0.3 sec./ MHz.
- All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.

7.5 DEVIATION FROM TEST STANDARD

No deviation

7.6 TEST SETUP LAYOUT





7.7 EUT OPERATING CONDITIONS

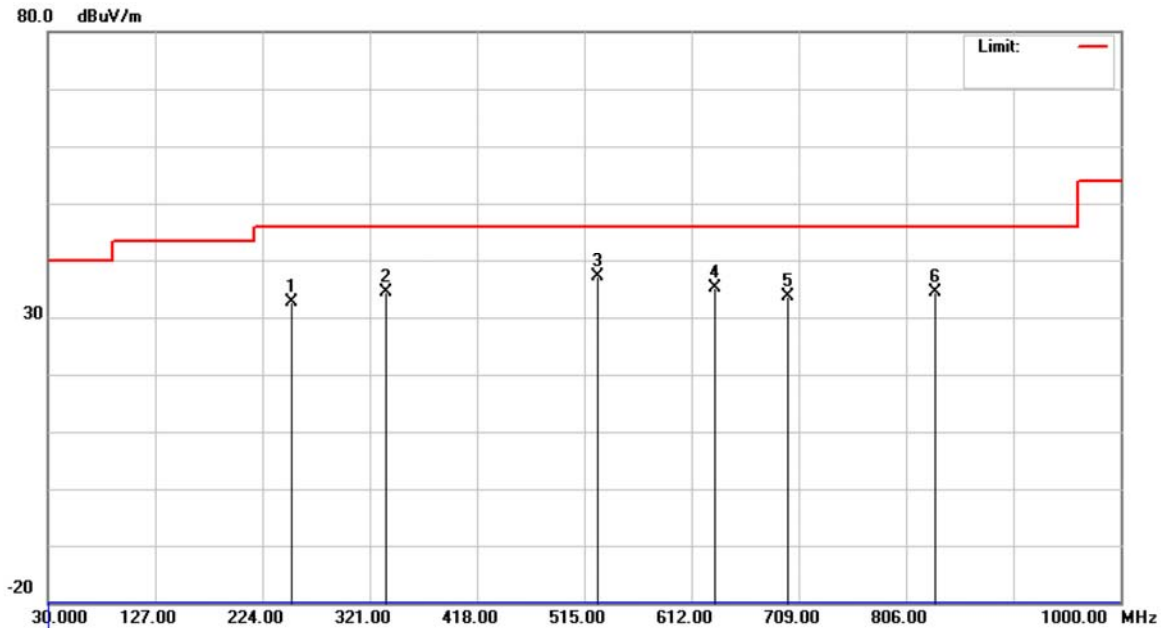
The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.



7.8 TEST RESULTS

E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2441 MHz		

Polarization: Vertical

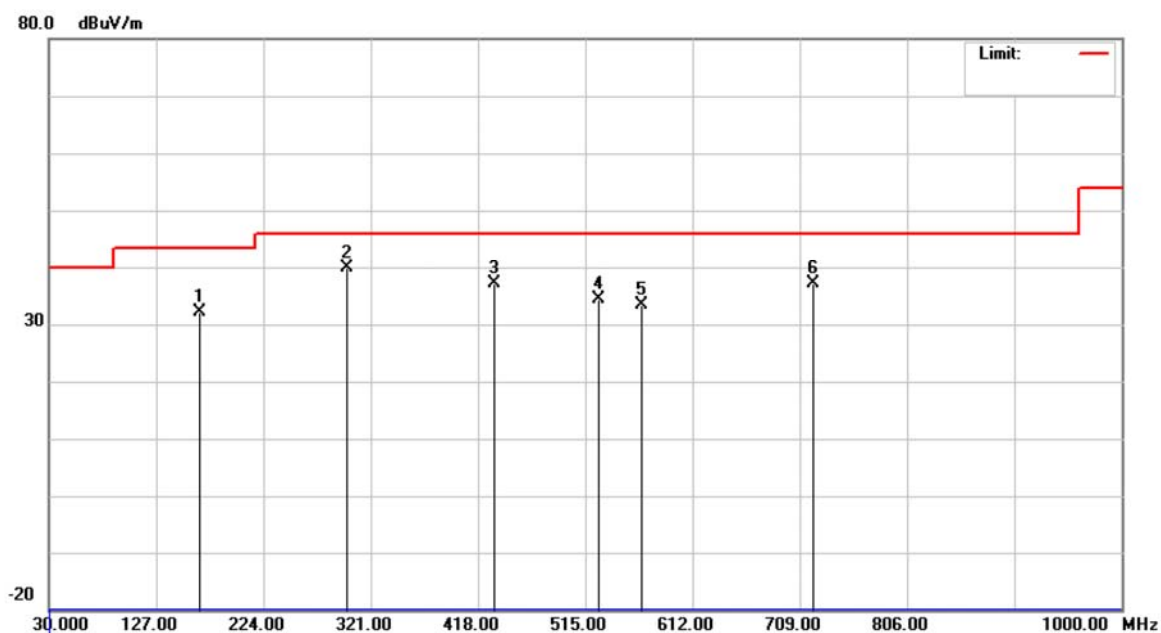


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		250.6750	48.61	-16.10	32.51	46.00	-13.49	peak	
2		335.5498	48.11	-13.84	34.27	46.00	-11.73	peak	
3	*	527.1250	46.54	-9.40	37.14	46.00	-8.86	peak	
4		633.8250	43.04	-7.81	35.23	46.00	-10.77	peak	
5		699.2998	40.98	-7.26	33.72	46.00	-12.28	peak	
6		832.6748	39.98	-5.51	34.47	46.00	-11.53	peak	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2441 MHz		

Polarization: Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		165.8000	43.64	-11.49	32.15	43.50	-11.35	peak	
2	*	299.1748	54.93	-14.93	40.00	46.00	-6.00	peak	
3		432.5498	48.01	-10.96	37.05	46.00	-8.95	peak	
4		527.1250	43.86	-9.40	34.46	46.00	-11.54	peak	
5		565.9248	42.02	-8.73	33.29	46.00	-12.71	peak	
6		721.1250	44.01	-6.98	37.03	46.00	-8.97	peak	



8 RADIATED SPURIOUS EMISSION (ABOVE 1 GHz)

8.1 LIMIT

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency Range: 9 kHz to 1 GHz		
FREQUENCY (MHz)	Field Strength (micровolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Frequency Range: above 1 GHz				
FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
above 1 GHz	80	60	74	54

NOTE:

- (1) The limit for radiated test was performed according to FCC PART 15B.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain(if use)
 Margin Level = Measurement Value – Limit Value



8.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 01, 2013
2	Horn Antenna	Schwarzbeck	BBHA 9120	D-325	Apr. 15, 2014
3	Microwave Pre_amplifier	Agilent	8449B	3008A01714	Apr. 16, 2014
4	Microflex Cable	N/A	N/A	1m	Apr. 13, 2014
5	Microflex Cable	AISI	S104-SMAP-1	10m	Apr. 13, 2014
6	Microflex Cable	N/A	N/A	3m	Apr. 13, 2014
7	Test Cable	N/A	LMR-400	966_12m	May. 14, 2014
8	Test Cable	N/A	LMR-400	966_3m	May. 14, 2014
9	Pre-Amplifier	EMC	EMC-330	980001	May. 30, 2014
10	Log-Bicon Antenna	Schwarzbeck	VULB9168-352	9168-352	Jun. 11, 2014

Remark: "N/A" denotes No Model Name, No Serial No. or No Calibration specified.

8.3 MEASURING INSTRUMENTS SETTING

Spectrum Analyzer	Parameter Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (other emission)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average



8.4 TEST PROCEDURES

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1 GHz. For frequencies above 1 GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m Semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.
- The testing follows the guidelines in ANSI C63.4 and FCC Public Notice DA 00-705 Measurement Guidelines. In case the emission is fail due to the used RBW/VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

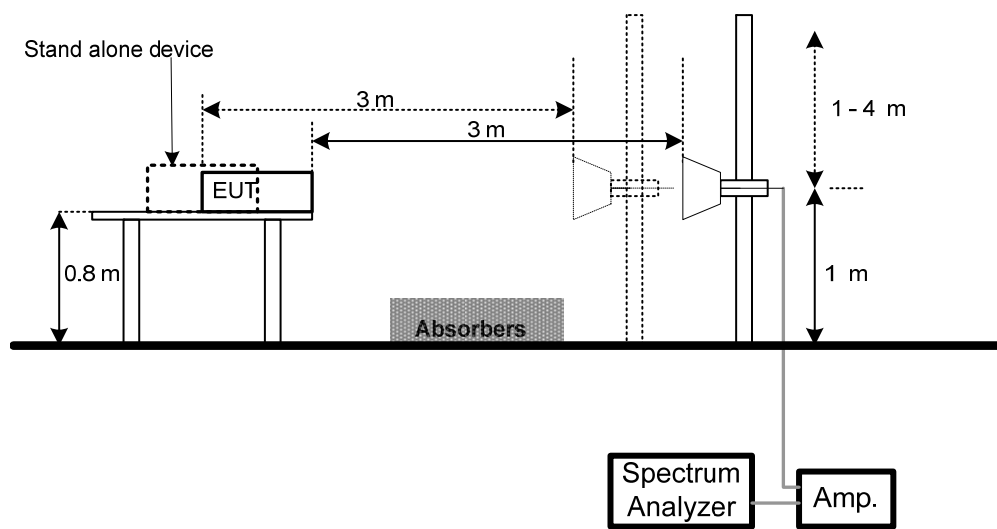
NOTE:

- Reading in which marked as Peak means measurements by using are Peak Mode with instrument setting in RBW= 1 MHz, VBW= 1 MHz, Swp. Time = Auto.
Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW= 1 MHz, VBW= 10 Hz, Swp. Time = Auto.
- All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform.

8.5 DEVIATION FROM TEST STANDARD

No deviation

8.6 TEST SETUP LAYOUT





8.7 EUT OPERATING CONDITIONS

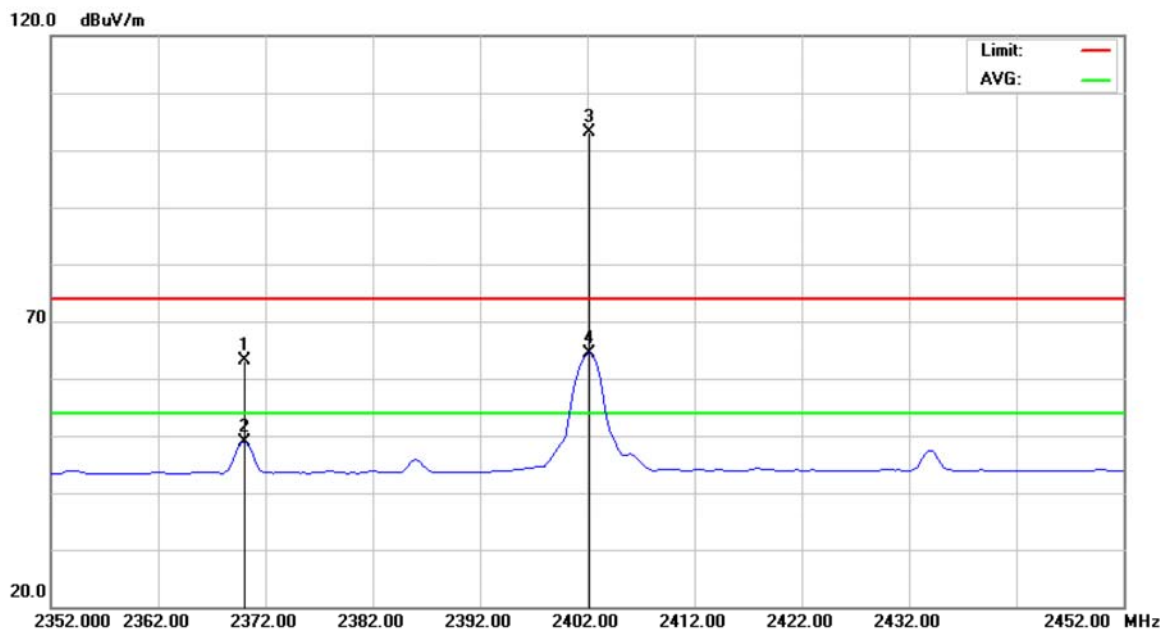
The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.



8.8 TEST RESULTS

E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2402 MHz		

Polarization: Vertical

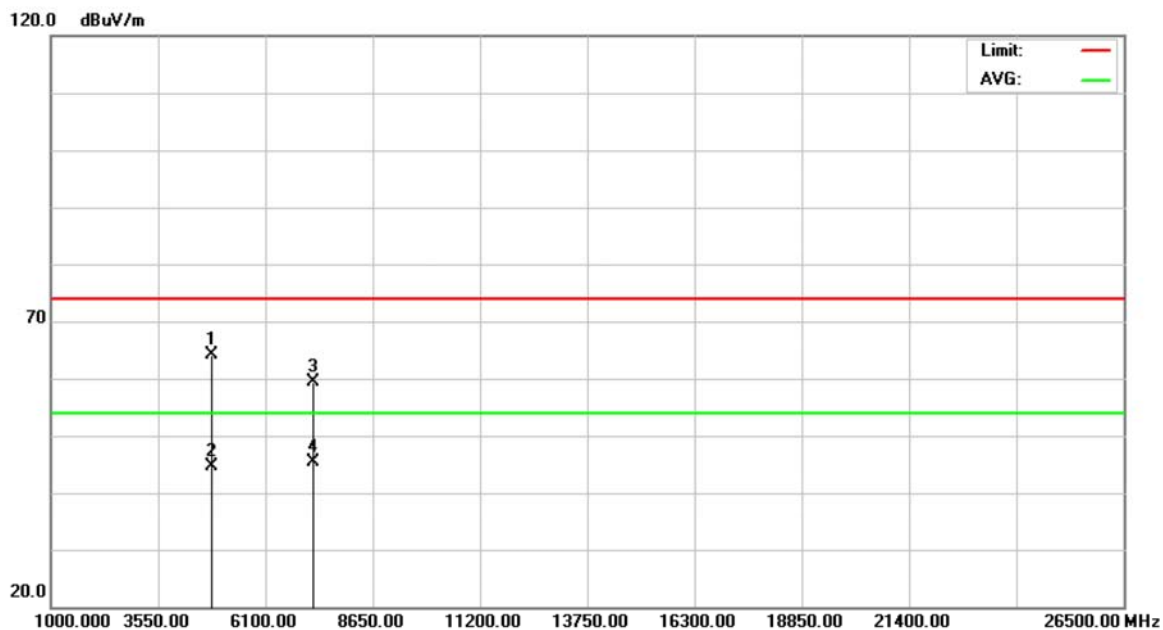


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2370.000	31.59	31.58	63.17	74.00	-10.83	peak	
2		2370.000	17.27	31.58	48.85	54.00	-5.15	AVG	
3	*	2402.250	71.31	31.72	103.03	74.00	29.03	peak	
4	X	2402.250	32.68	31.72	64.40	54.00	10.40	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2402 MHz		

Polarization: Vertical

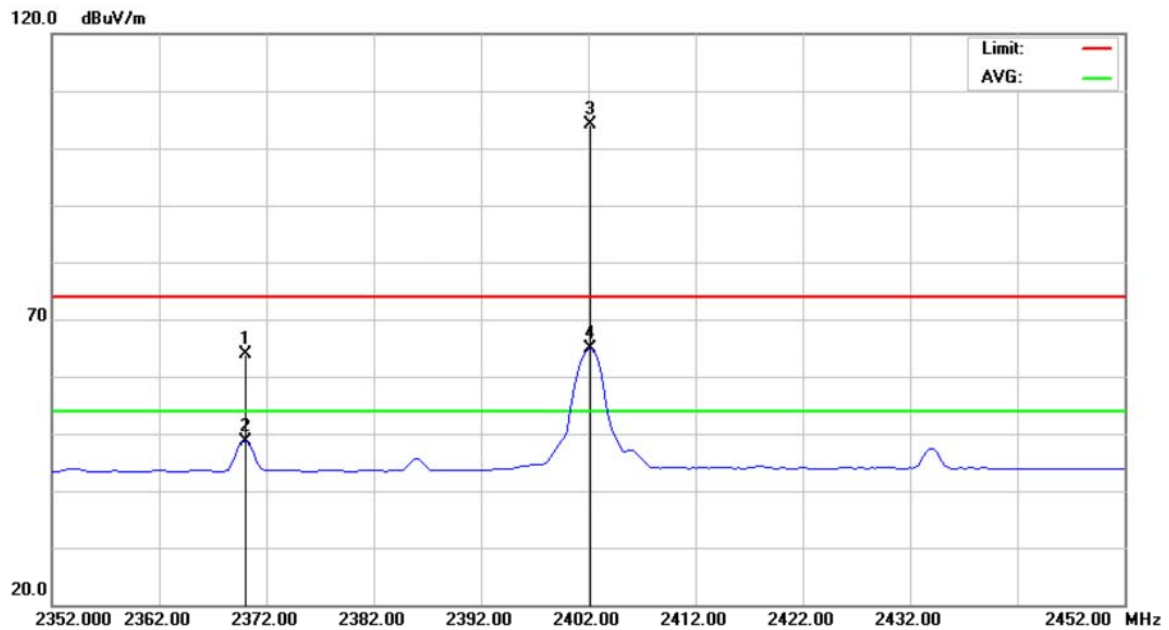


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.025	58.35	5.69	64.04	74.00	-9.96	peak	
2		4804.025	39.04	5.69	44.73	54.00	-9.27	AVG	
3		7205.925	47.20	12.18	59.38	74.00	-14.62	peak	
4	*	7205.925	33.25	12.18	45.43	54.00	-8.57	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2402 MHz		

Polarization: Horizontal

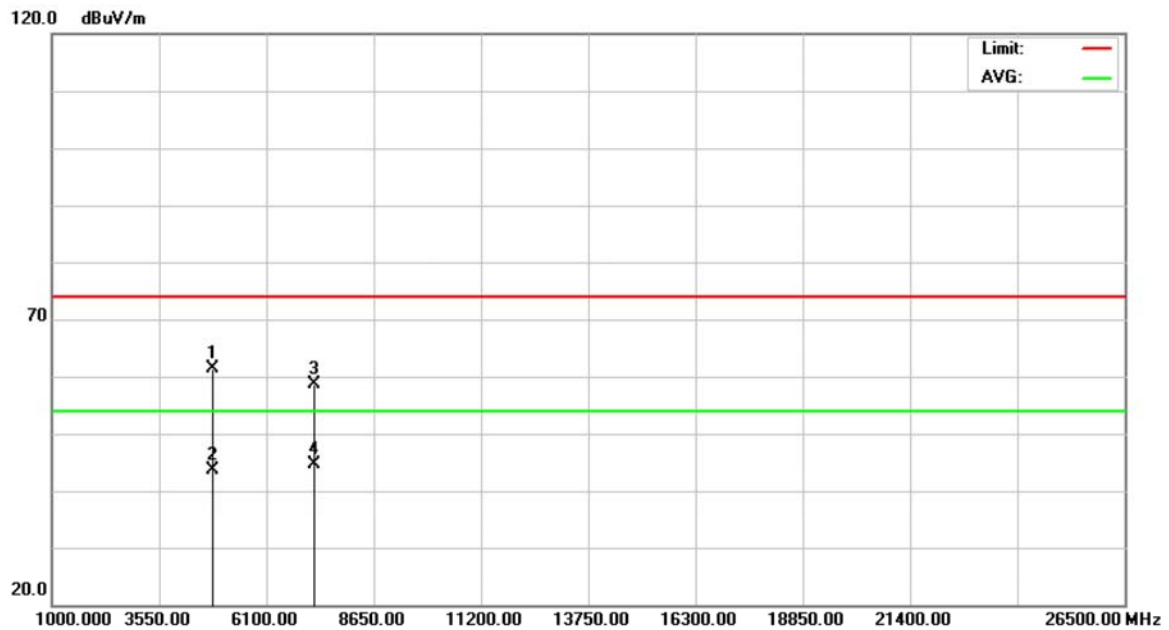


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2370.000	32.23	31.58	63.81	74.00	-10.19	peak	
2		2370.000	17.05	31.58	48.63	54.00	-5.37	AVG	
3	*	2402.250	72.37	31.72	104.09	74.00	30.09	peak	
4	X	2402.250	33.14	31.72	64.86	54.00	10.86	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2402 MHz		

Polarization: Horizontal

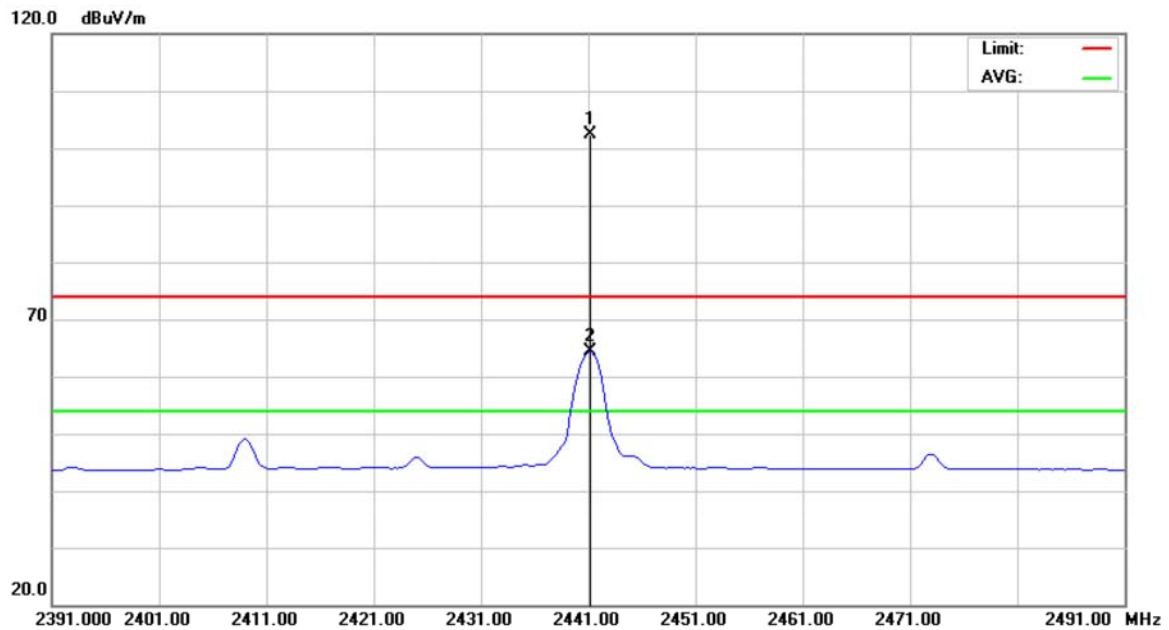


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4803.962	55.76	5.69	61.45	74.00	-12.55	peak	
2		4803.962	38.03	5.69	43.72	54.00	-10.28	AVG	
3		7205.975	46.49	12.18	58.67	74.00	-15.33	peak	
4	*	7205.975	32.41	12.18	44.59	54.00	-9.41	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2441 MHz		

Polarization: Vertical

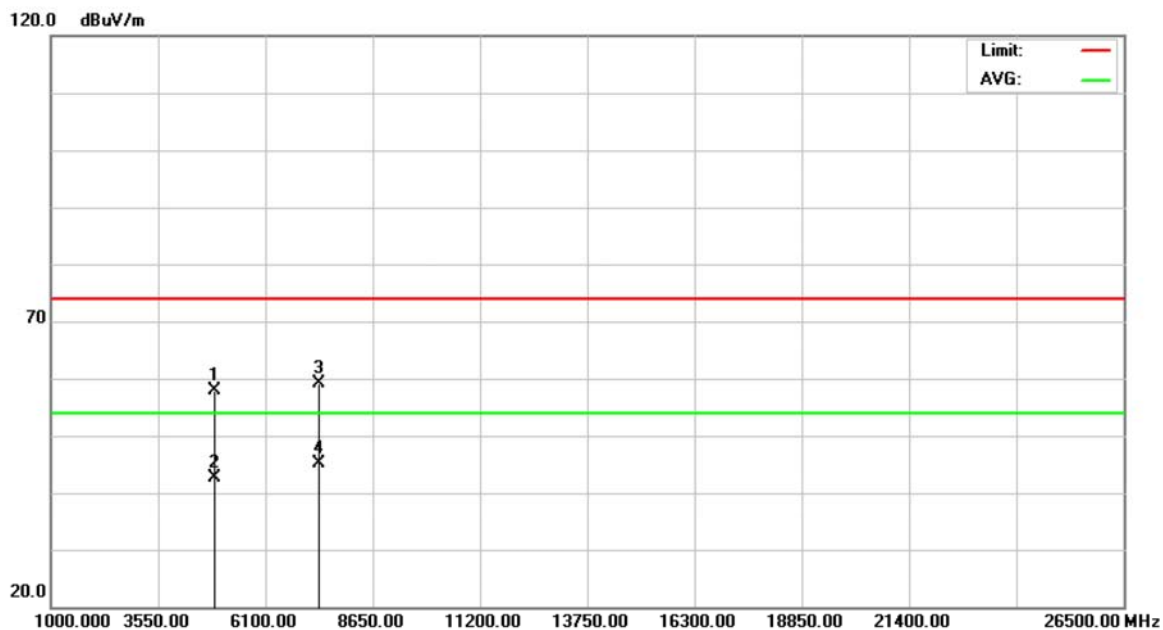


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	2441.250	70.58	31.90	102.48	74.00	28.48	peak	
2	X	2441.250	32.52	31.90	64.42	54.00	10.42	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2441 MHz		

Polarization: Vertical

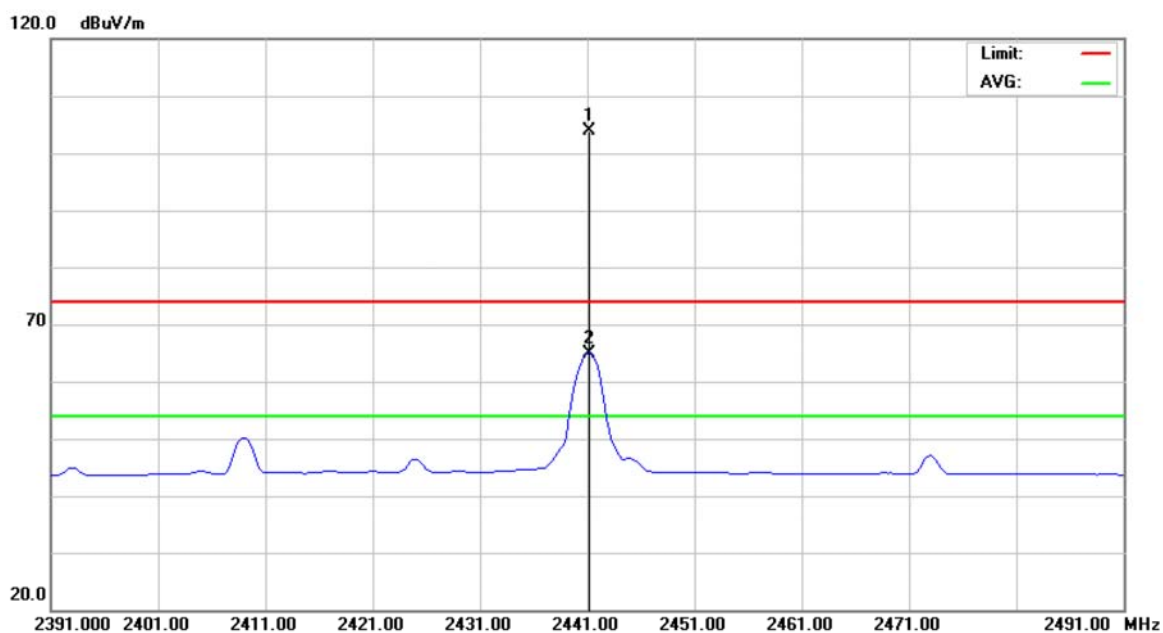


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4881.976	52.12	5.79	57.91	74.00	-16.09	peak	
2		4881.976	36.87	5.79	42.66	54.00	-11.34	AVG	
3		7322.927	46.42	12.61	59.03	74.00	-14.97	peak	
4	*	7322.927	32.55	12.61	45.16	54.00	-8.84	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2441 MHz		

Polarization: Horizontal

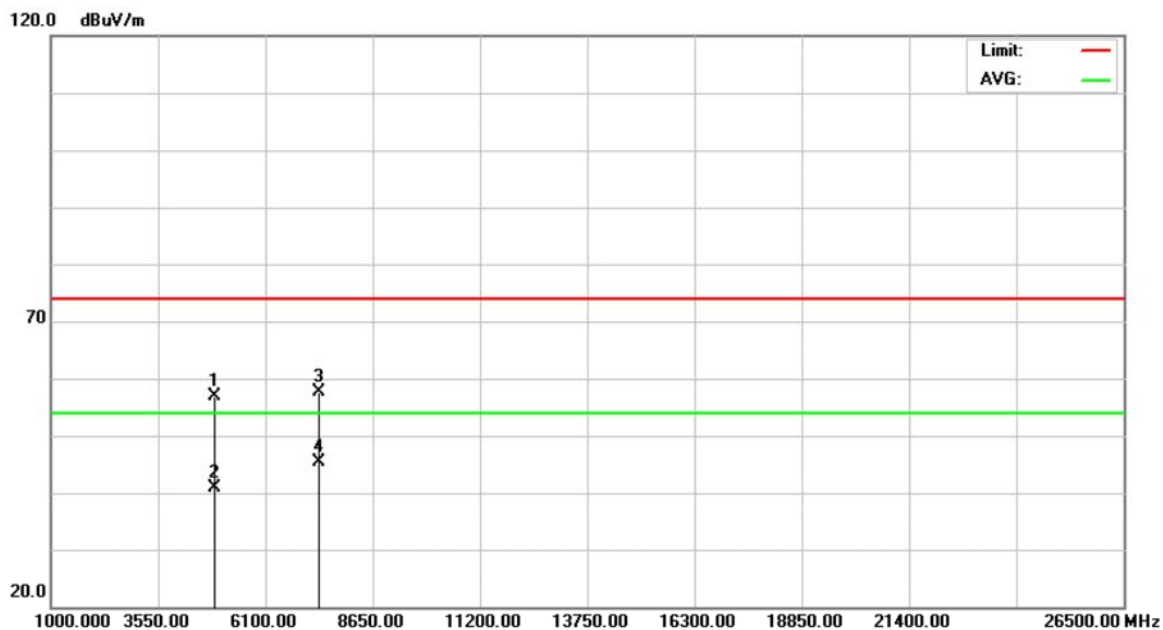


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	2441.250	71.97	31.90	103.87	74.00	29.87	peak	
2	X	2441.250	33.10	31.90	65.00	54.00	11.00	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2441 MHz		

Polarization: Horizontal

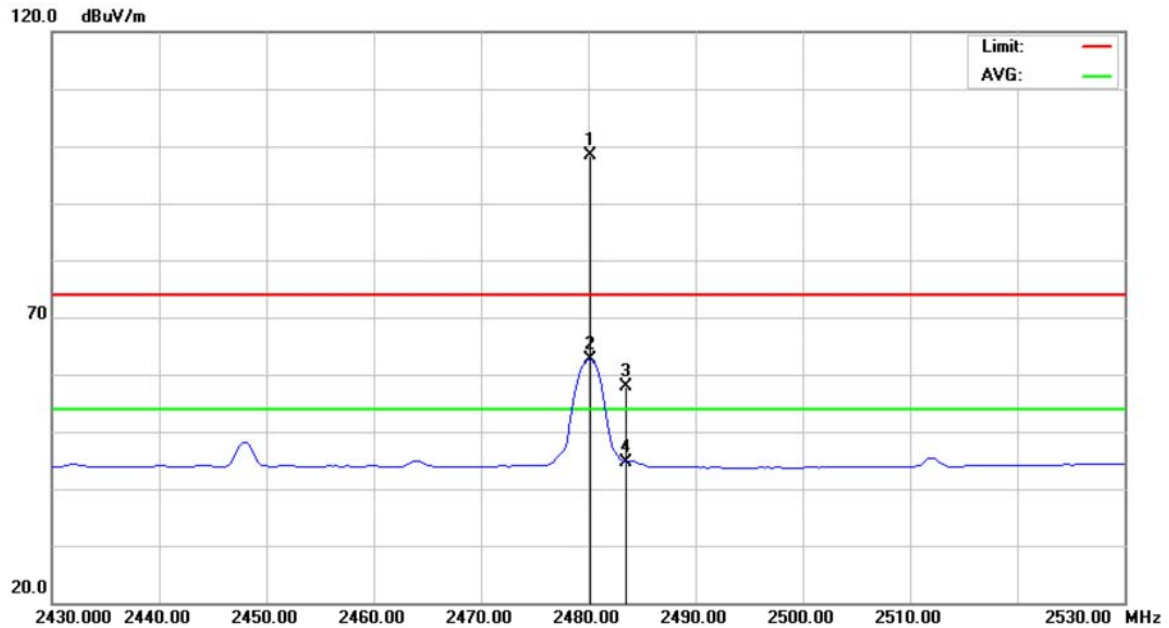


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4881.952	51.16	5.79	56.95	74.00	-17.05	peak	
2		4881.952	35.09	5.79	40.88	54.00	-13.12	AVG	
3		7322.927	44.99	12.61	57.60	74.00	-16.40	peak	
4	*	7322.927	32.67	12.61	45.28	54.00	-8.72	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2480 MHz		

Polarization: Vertical

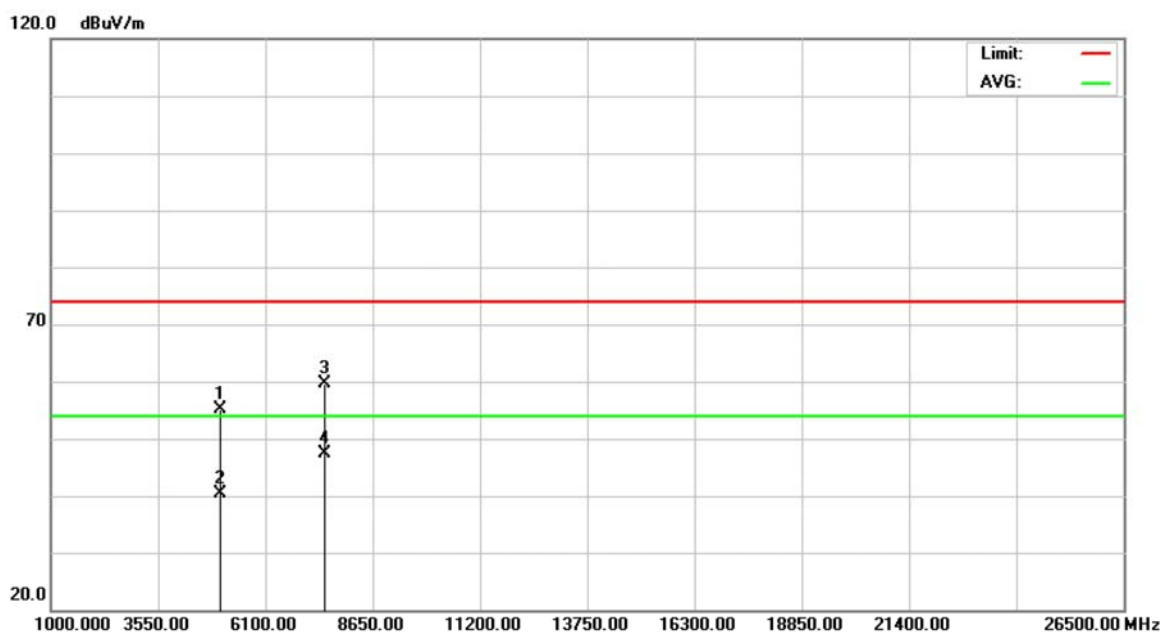


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	2480.250	66.33	32.07	98.40	74.00	24.40	peak	
2	X	2480.250	30.60	32.07	62.67	54.00	8.67	AVG	
3		2483.500	25.74	32.09	57.83	74.00	-16.17	peak	
4		2483.500	12.65	32.09	44.74	54.00	-9.26	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2480 MHz		

Polarization: Vertical

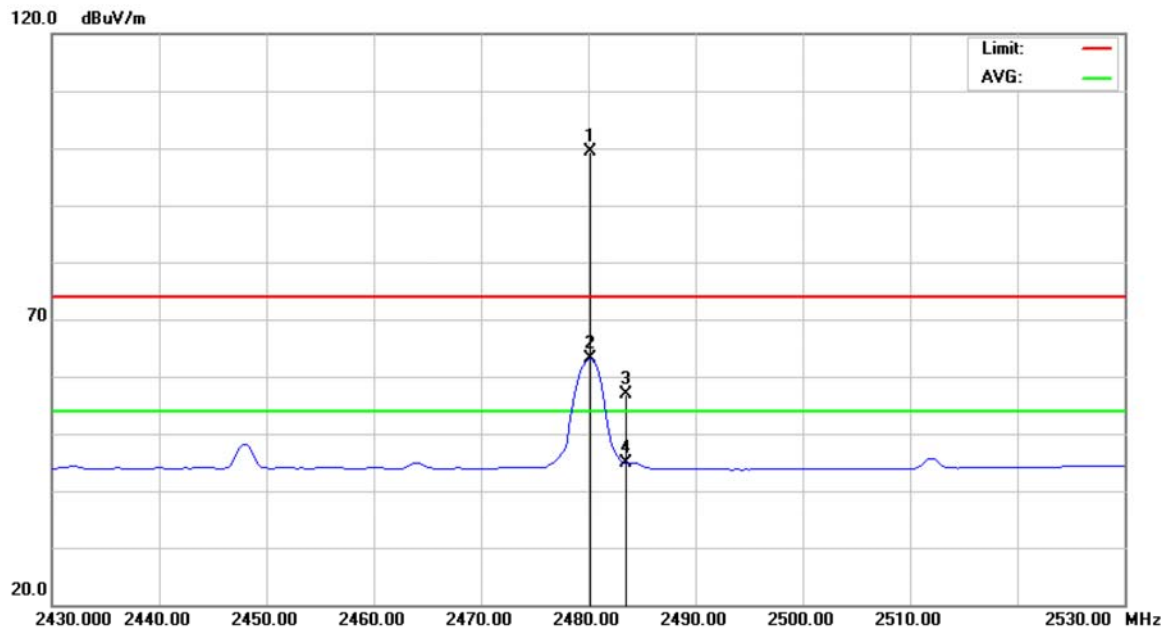


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4960.013	49.30	5.89	55.19	74.00	-18.81	peak	
2		4960.013	34.60	5.89	40.49	54.00	-13.51	AVG	
3		7439.950	46.50	13.05	59.55	74.00	-14.45	peak	
4	*	7439.950	34.31	13.05	47.36	54.00	-6.64	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2480 MHz		

Polarization: Horizontal

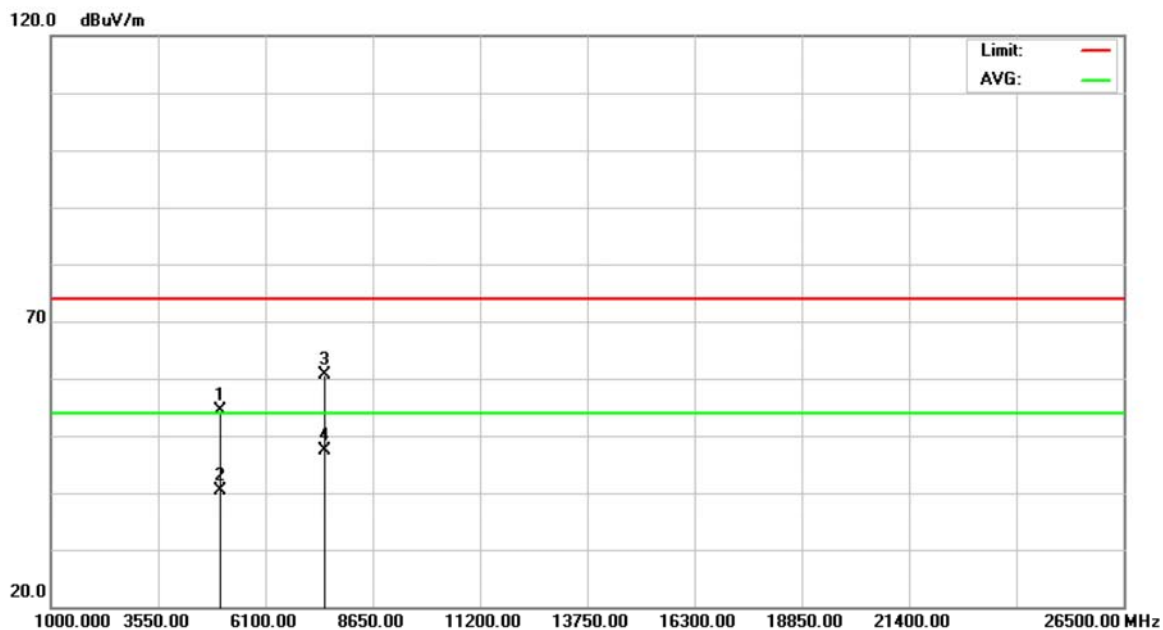


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	2480.250	67.20	32.07	99.27	74.00	25.27	peak	
2	X	2480.250	31.01	32.07	63.08	54.00	9.08	AVG	
3		2483.500	24.72	32.09	56.81	74.00	-17.19	peak	
4		2483.500	12.84	32.09	44.93	54.00	-9.07	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2480 MHz		

Polarization: Horizontal

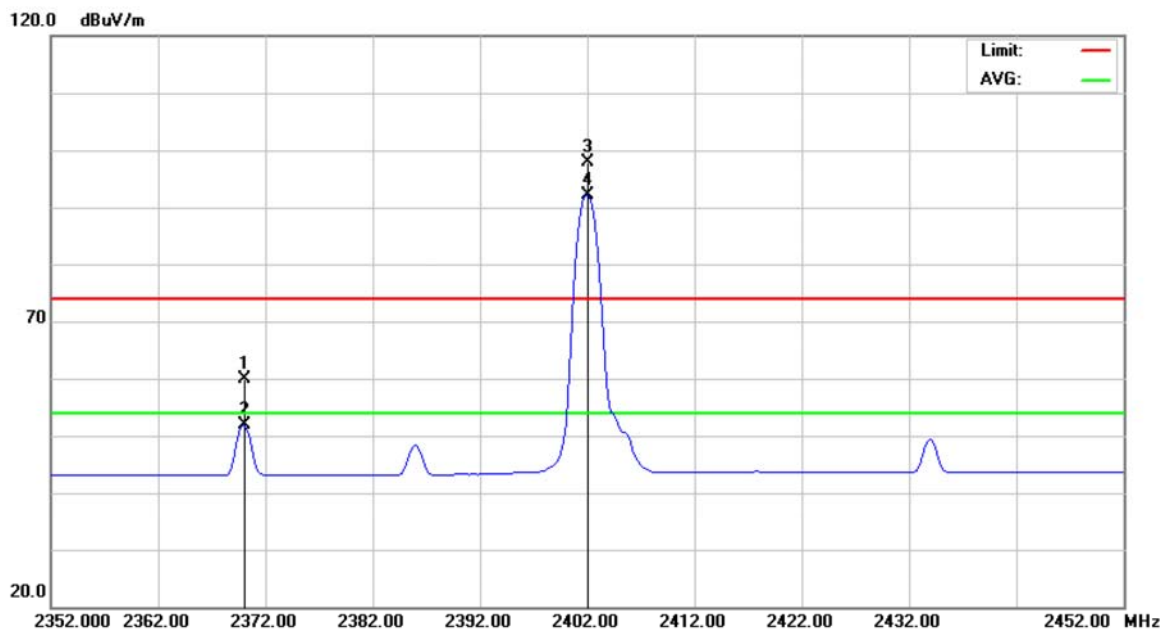


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4959.962	48.61	5.89	54.50	74.00	-19.50	peak	
2		4959.962	34.53	5.89	40.42	54.00	-13.58	AVG	
3		7439.950	47.54	13.05	60.59	74.00	-13.41	peak	
4	*	7439.950	34.22	13.05	47.27	54.00	-6.73	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2402 MHz		

Polarization: Vertical

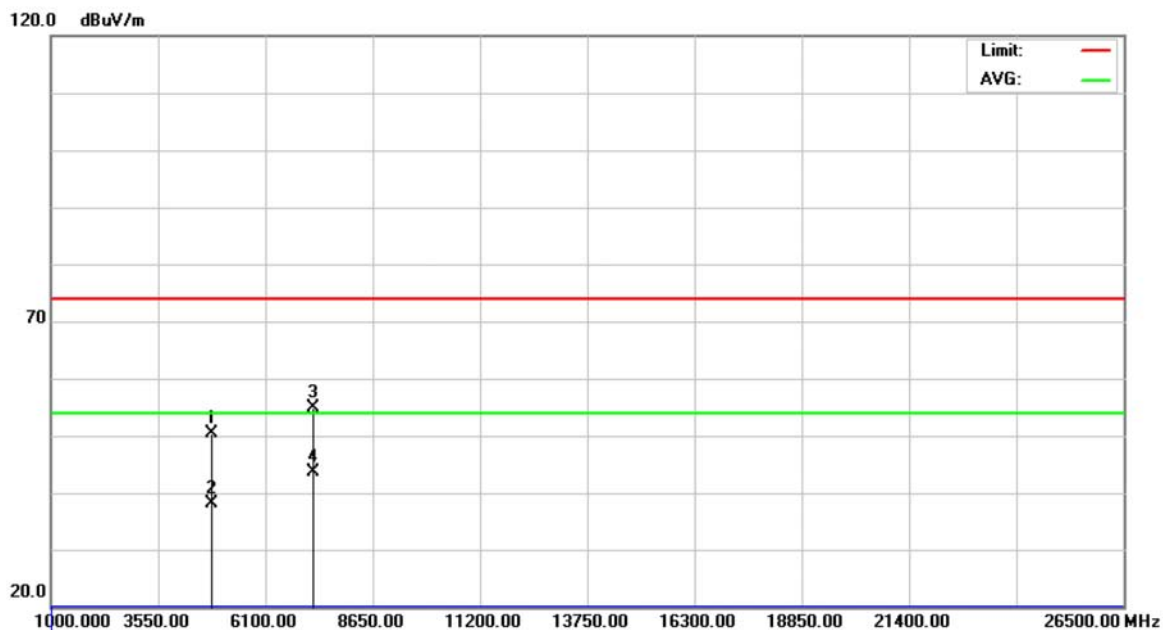


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2370.000	28.26	31.58	59.84	74.00	-14.16	peak	
2		2370.000	20.22	31.58	51.80	54.00	-2.20	AVG	
3	X	2402.000	66.24	31.72	97.96	74.00	23.96	peak	
4	*	2402.000	60.51	31.72	92.23	54.00	38.23	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2402 MHz		

Polarization: Vertical

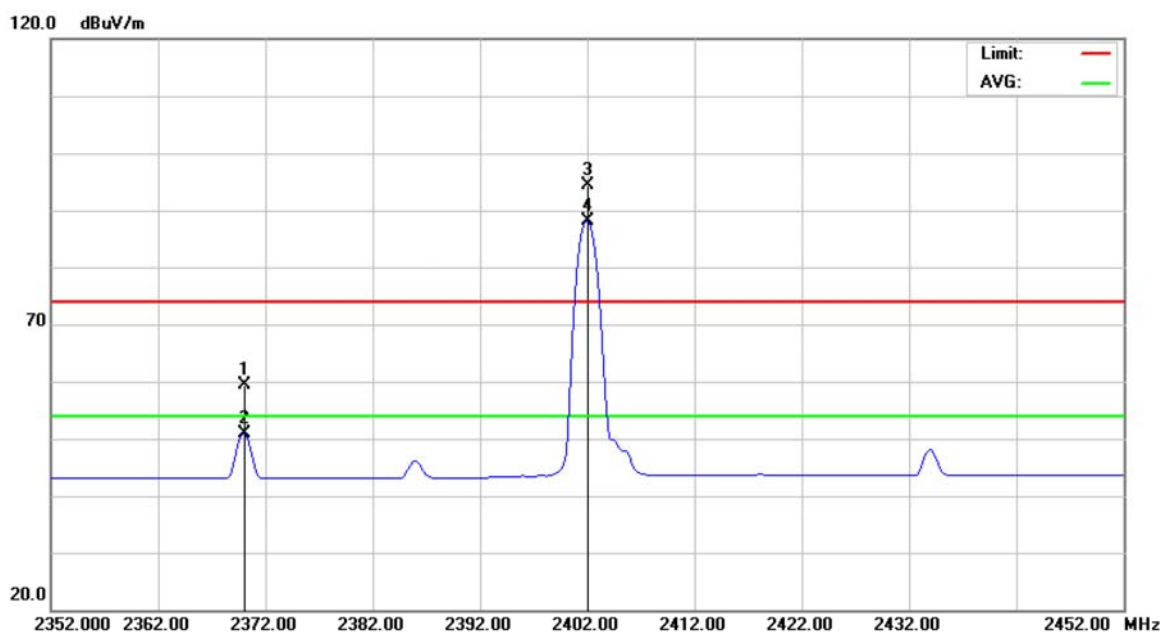


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.000	44.65	5.69	50.34	74.00	-23.66	peak	
2		4804.000	32.41	5.69	38.10	54.00	-15.90	AVG	
3		7206.000	42.81	12.18	54.99	74.00	-19.01	peak	
4	*	7206.000	31.45	12.18	43.63	54.00	-10.37	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2402 MHz		

Polarization: Horizontal

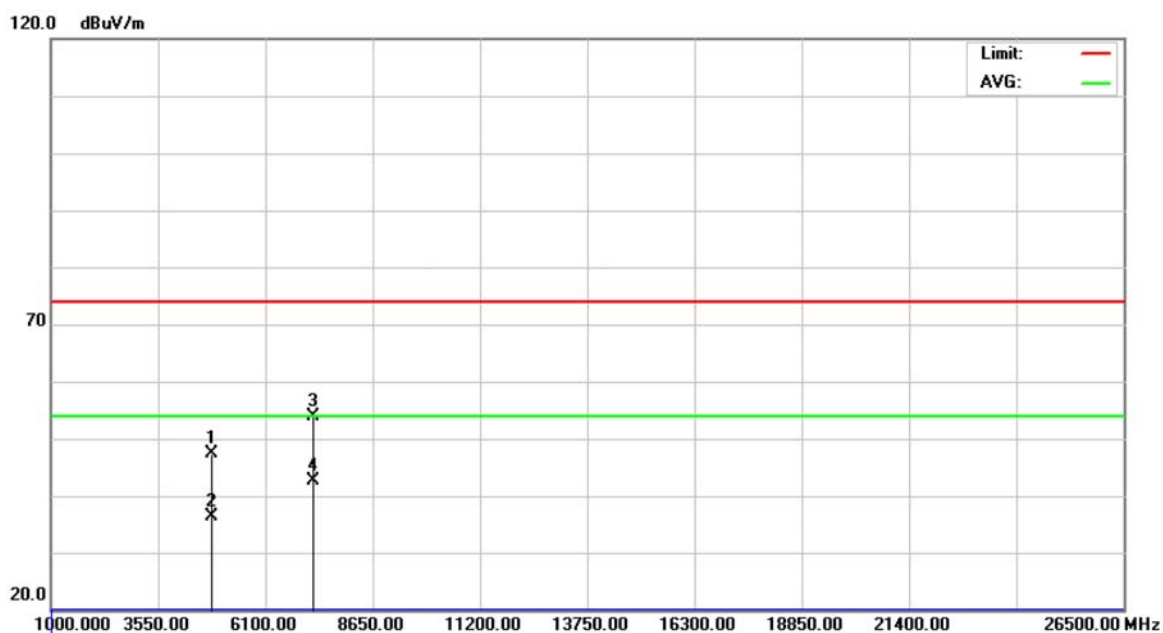


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2370.000	27.75	31.58	59.33	74.00	-14.67	peak	
2		2370.000	19.26	31.58	50.84	54.00	-3.16	AVG	
3	X	2402.000	62.73	31.72	94.45	74.00	20.45	peak	
4	*	2402.000	56.48	31.72	88.20	54.00	34.20	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2402 MHz		

Polarization: Horizontal

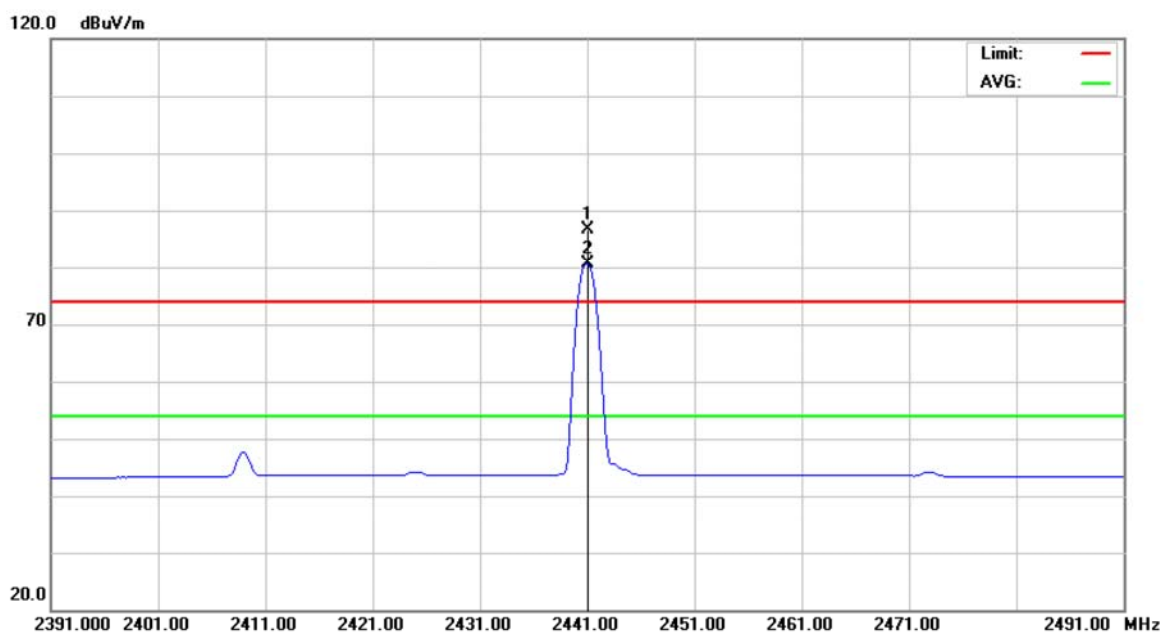


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4803.900	41.71	5.69	47.40	74.00	-26.60	peak	
2		4803.900	30.81	5.69	36.50	54.00	-17.50	AVG	
3		7206.000	41.76	12.18	53.94	74.00	-20.06	peak	
4	*	7206.000	30.48	12.18	42.66	54.00	-11.34	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2441 MHz		

Polarization: Vertical

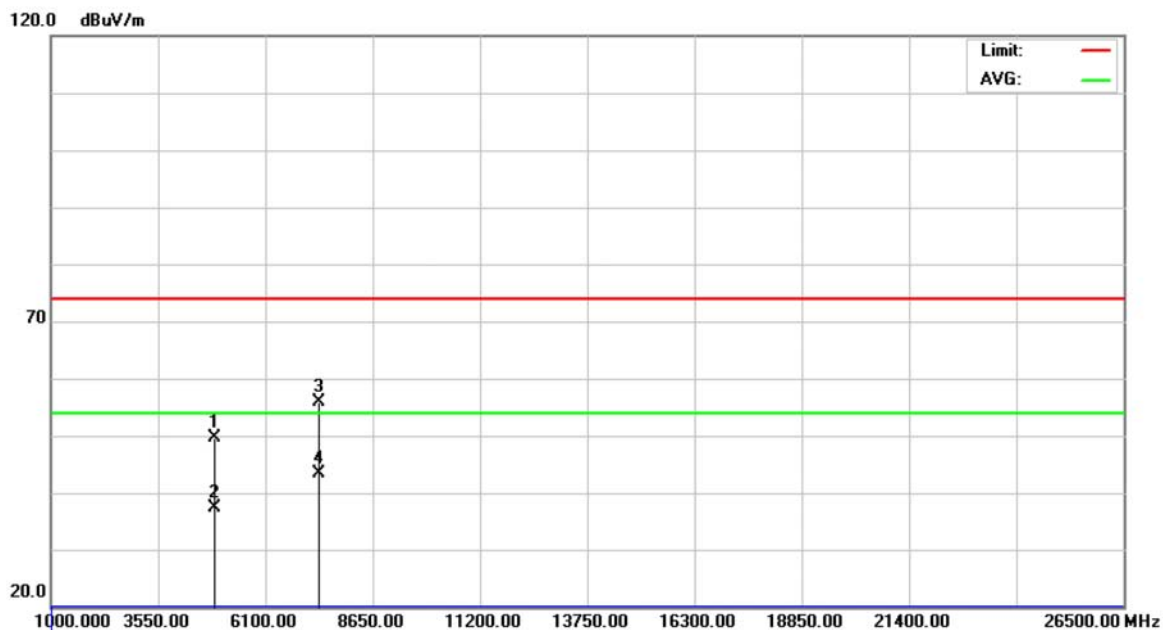


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2441.000	54.74	31.90	86.64	74.00	12.64	peak	
2	*	2441.000	48.85	31.90	80.75	54.00	26.75	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2441 MHz		

Polarization: Vertical

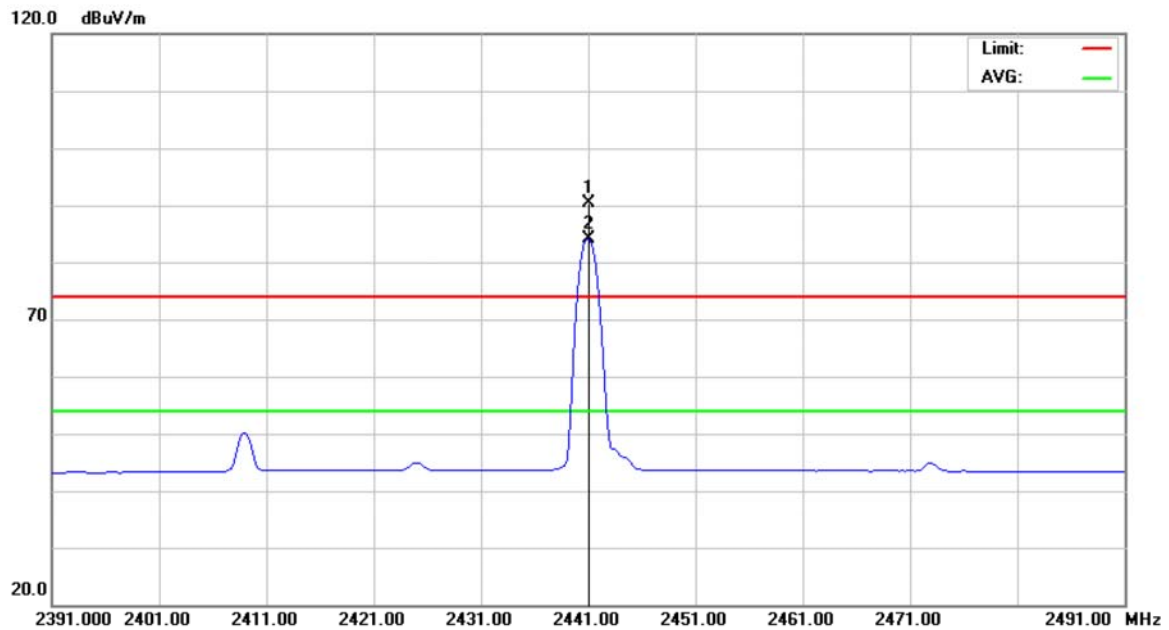


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4881.850	43.88	5.79	49.67	74.00	-24.33	peak	
2		4881.850	31.66	5.79	37.45	54.00	-16.55	AVG	
3		7322.788	43.16	12.61	55.77	74.00	-18.23	peak	
4	*	7322.788	30.81	12.61	43.42	54.00	-10.58	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2441 MHz		

Polarization: Horizontal

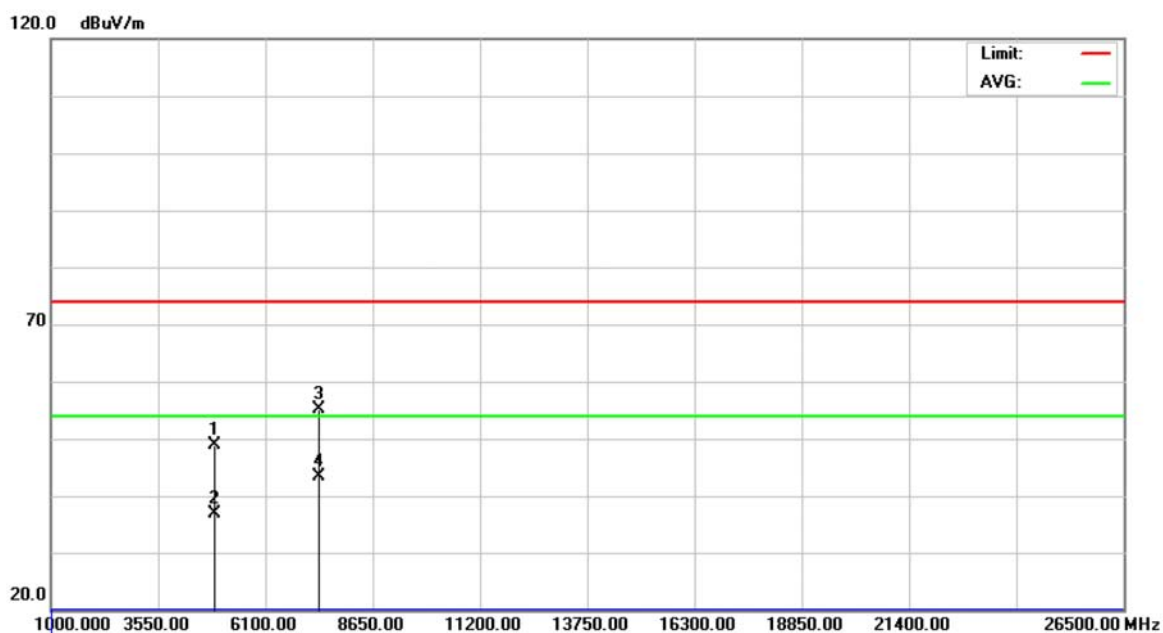


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2441.000	58.49	31.90	90.39	74.00	16.39	peak	
2	*	2441.000	52.33	31.90	84.23	54.00	30.23	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2441 MHz		

Polarization: Horizontal

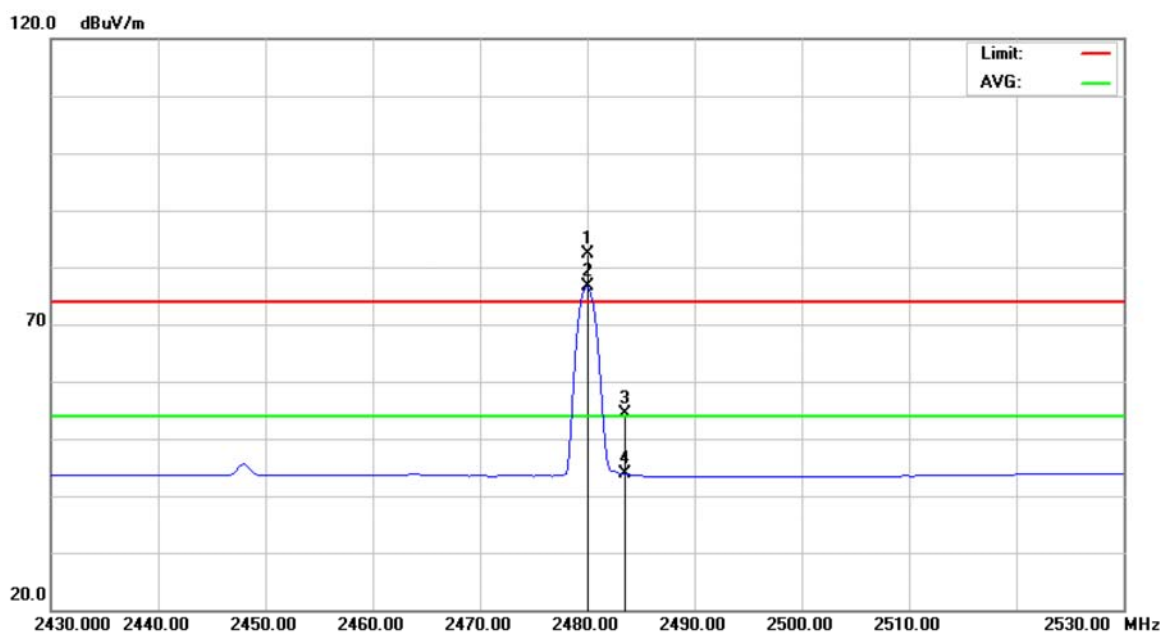


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4882.175	43.02	5.79	48.81	74.00	-25.19	peak	
2		4882.175	31.01	5.79	36.80	54.00	-17.20	AVG	
3		7323.087	42.64	12.61	55.25	74.00	-18.75	peak	
4	*	7323.087	30.84	12.61	43.45	54.00	-10.55	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2480 MHz		

Polarization: Vertical

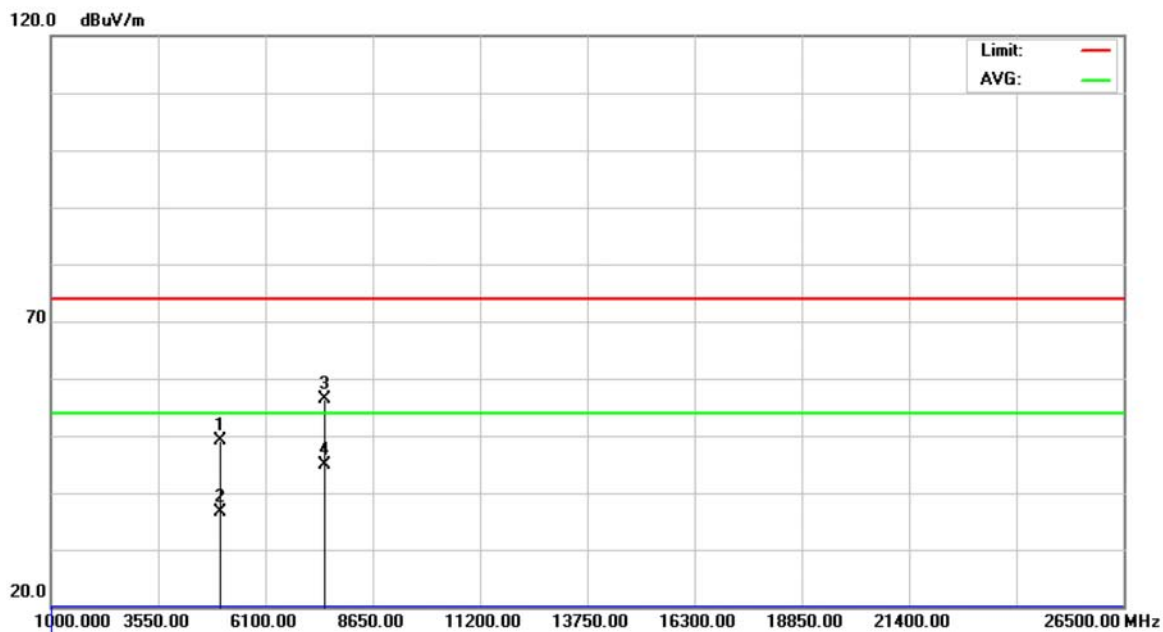


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	50.36	32.07	82.43	74.00	8.43	peak	
2	*	2480.000	44.49	32.07	76.56	54.00	22.56	AVG	
3		2483.500	22.20	32.09	54.29	74.00	-19.71	peak	
4		2483.500	11.76	32.09	43.85	54.00	-10.15	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2480 MHz		

Polarization: Vertical

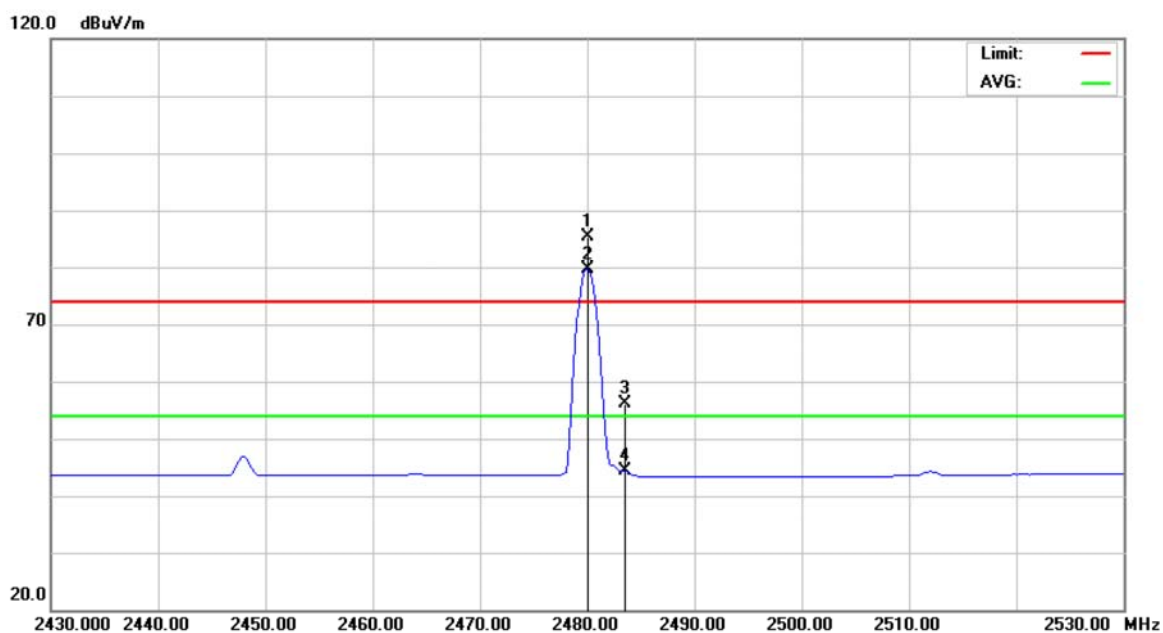


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4959.887	43.12	5.89	49.01	74.00	-24.99	peak	
2		4959.887	30.63	5.89	36.52	54.00	-17.48	AVG	
3		7439.738	43.39	13.05	56.44	74.00	-17.56	peak	
4	*	7439.738	31.85	13.05	44.90	54.00	-9.10	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2480 MHz		

Polarization: Horizontal

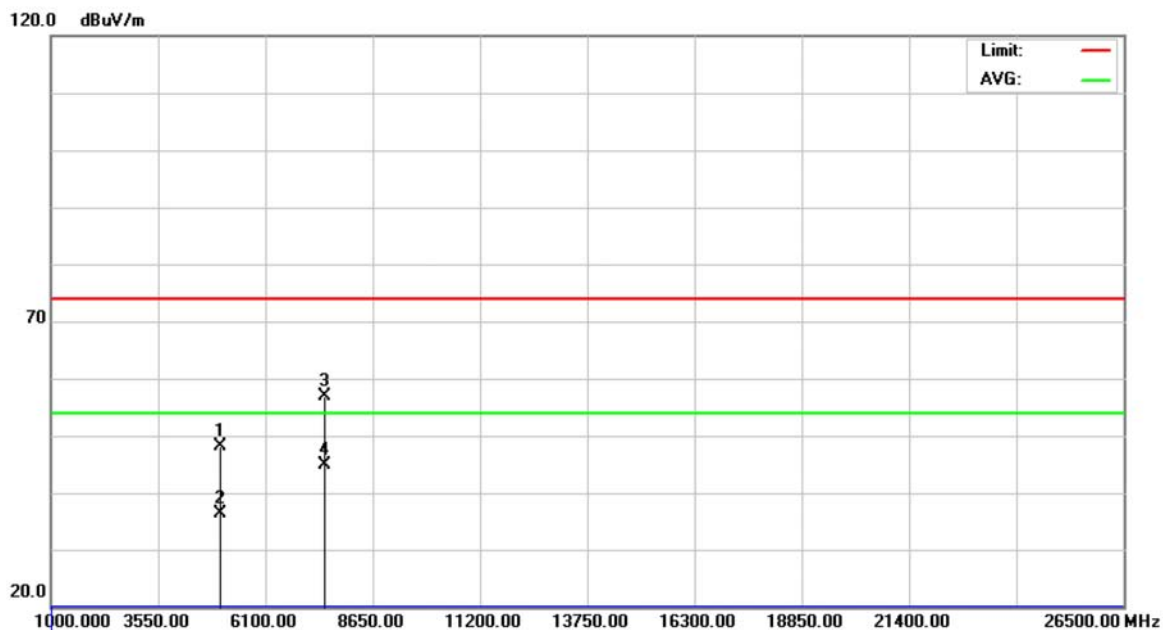


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	53.43	32.07	85.50	74.00	11.50	peak	
2	*	2480.000	47.63	32.07	79.70	54.00	25.70	AVG	
3		2483.500	24.02	32.09	56.11	74.00	-17.89	peak	
4		2483.500	12.26	32.09	44.35	54.00	-9.65	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2480 MHz		

Polarization: Horizontal



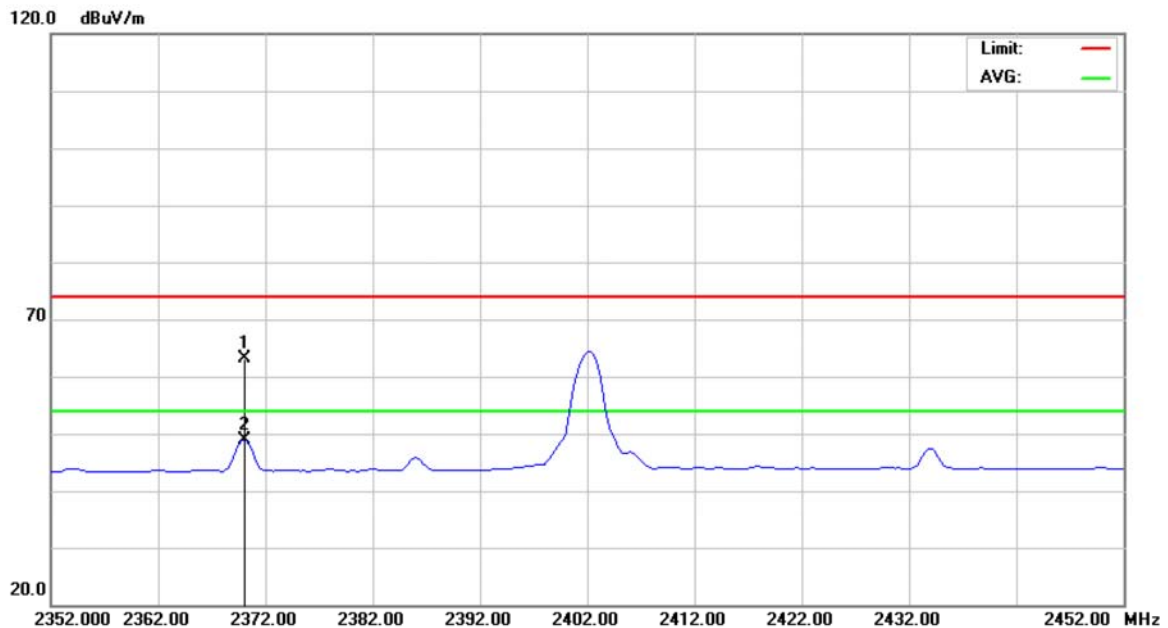
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4960.337	42.16	5.89	48.05	74.00	-25.95	peak	
2		4960.337	30.52	5.89	36.41	54.00	-17.59	AVG	
3		7439.750	43.81	13.05	56.86	74.00	-17.14	peak	
4	*	7439.750	31.79	13.05	44.84	54.00	-9.16	AVG	



8.9 TEST RESULTS (RESTRICTED BANDS)

E.U.T	RF Module	Model Name	R8001
Temperature	16°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2402 MHz		
NOTE	The transmitter was setup to transmit at the lowest channel and the field strength was measured at 2310-2390 MHz.		

Polarization: Vertical

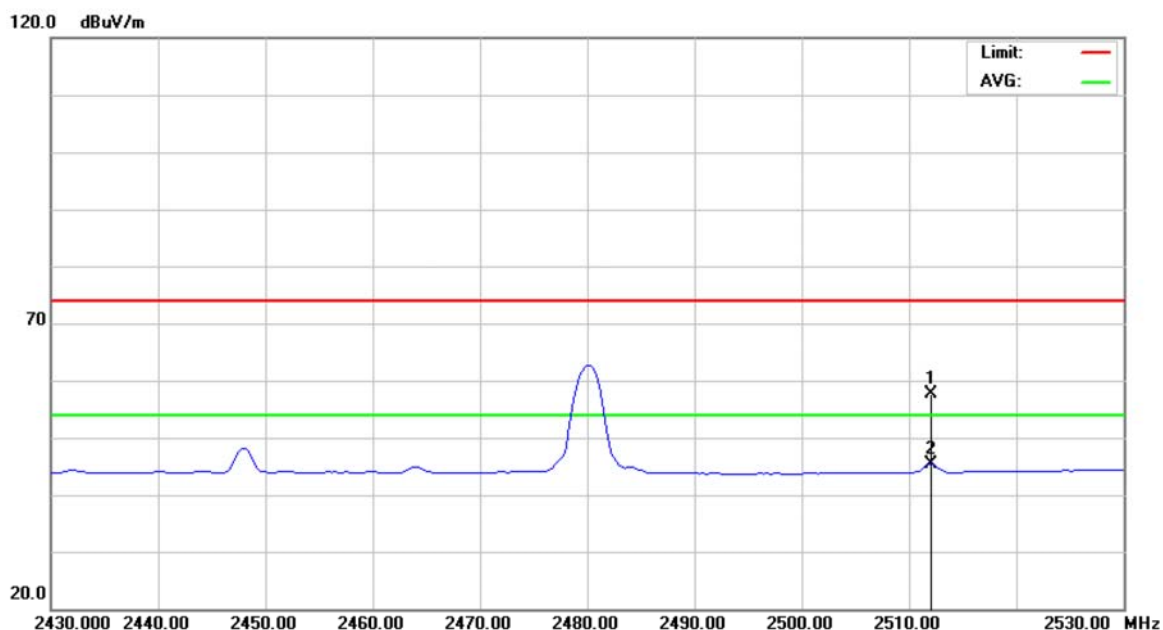


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2370.000	31.59	31.58	63.17	74.00	-10.83	peak	
2	*	2370.000	17.27	31.58	48.85	54.00	-5.15	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	16°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2480 MHz		
NOTE	The transmitter was setup to transmit at the highest channel and the field strength was measured at 2483.5-2500 MHz.		

Polarization: Vertical

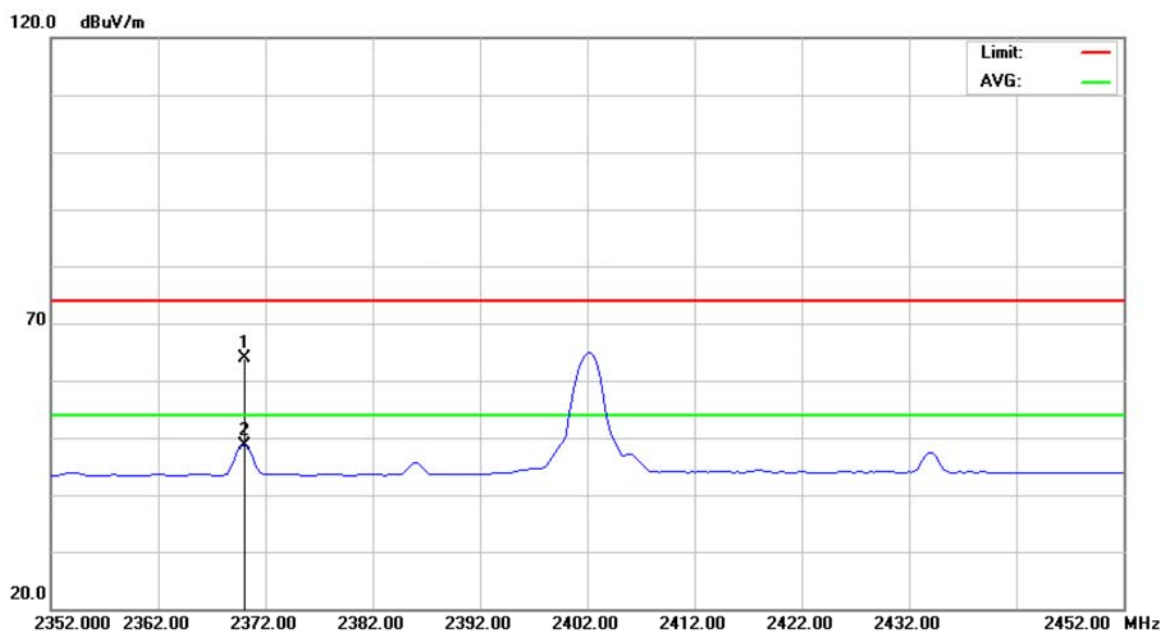


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	2512.000	25.45	32.18	57.63	74.00	-16.37	peak	
2 *	2512.000	13.28	32.18	45.46	54.00	-8.54	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	16°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2402 MHz		
NOTE	The transmitter was setup to transmit at the lowest channel and the field strength was measured at 2310-2390 MHz.		

Polarization: Horizontal

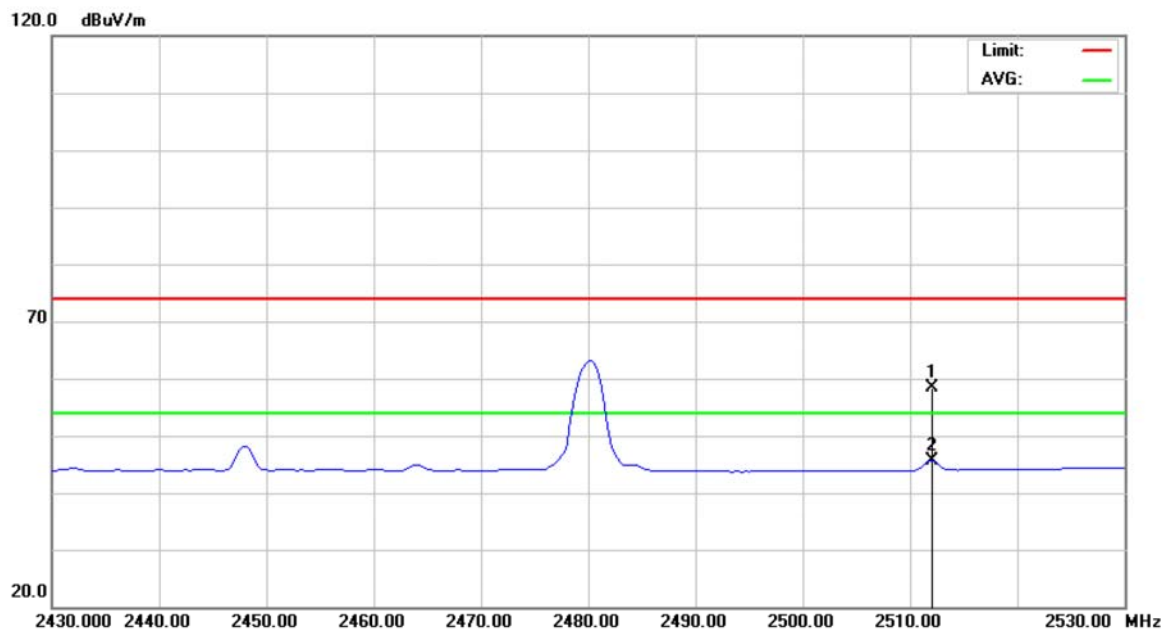


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2370.000	32.23	31.58	63.81	74.00	-10.19	peak	
2	*	2370.000	17.05	31.58	48.63	54.00	-5.37	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	16°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2480 MHz		
NOTE	The transmitter was setup to transmit at the highest channel and the field strength was measured at 2483.5-2500 MHz.		

Polarization: Horizontal

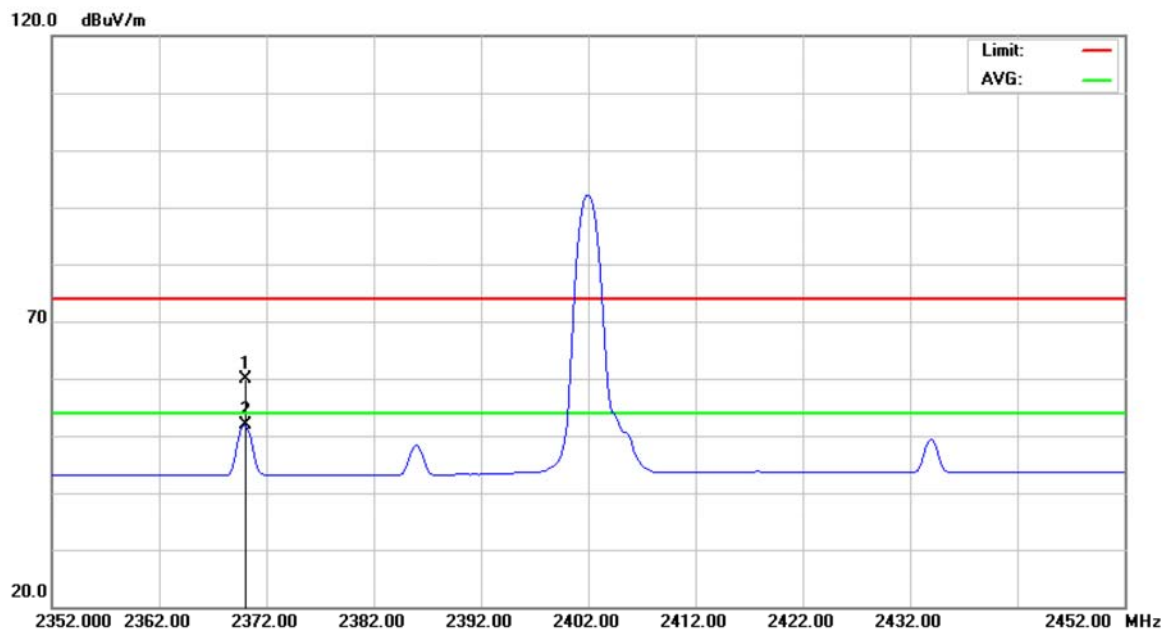


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2512.000	26.18	32.18	58.36	74.00	-15.64	peak	
2	*	2512.000	13.54	32.18	45.72	54.00	-8.28	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	16°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2402 MHz		
NOTE	The transmitter was setup to transmit at the lowest channel and the field strength was measured at 2310-2390 MHz.		

Polarization: Vertical

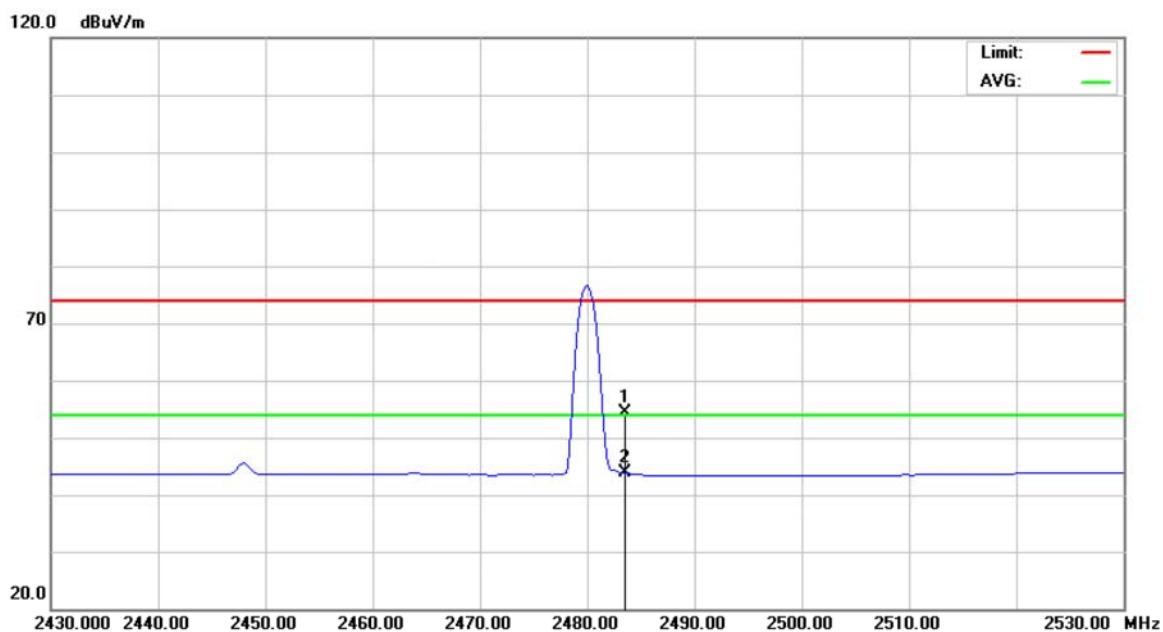


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	2370.000	28.26	31.58	59.84	74.00	-14.16	peak	
2 *	2370.000	20.22	31.58	51.80	54.00	-2.20	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	16°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2480 MHz		
NOTE	The transmitter was setup to transmit at the highest channel and the field strength was measured at 2483.5-2500 MHz.		

Polarization: Vertical

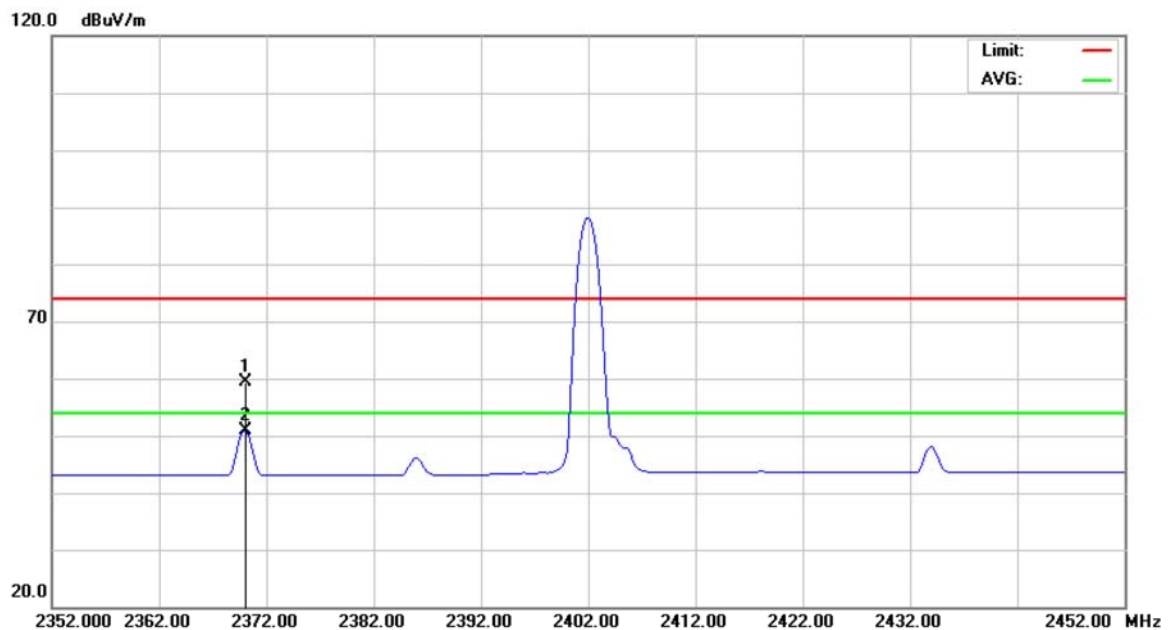


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2483.500	22.20	32.09	54.29	74.00	-19.71	peak	
2	*	2483.500	11.76	32.09	43.85	54.00	-10.15	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	16°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2402 MHz		
NOTE	The transmitter was setup to transmit at the lowest channel and the field strength was measured at 2310-2390 MHz.		

Polarization: Horizontal

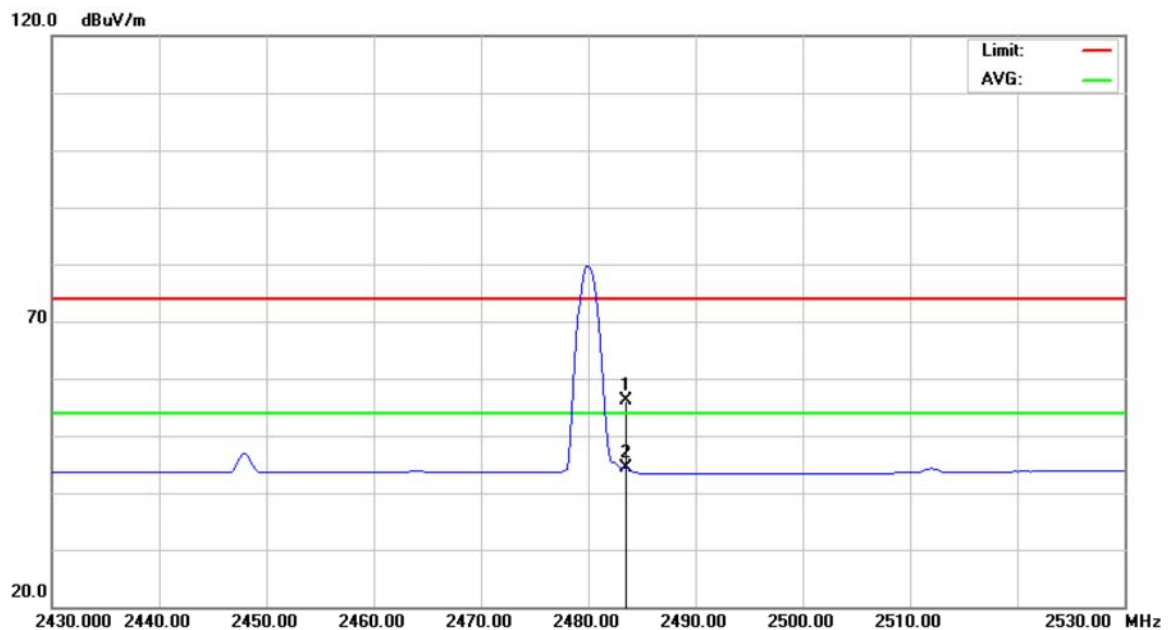


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2370.000	27.75	31.58	59.33	74.00	-14.67	peak	
2	*	2370.000	19.26	31.58	50.84	54.00	-3.16	AVG	



E.U.T	RF Module	Model Name	R8001
Temperature	16°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2480 MHz		
NOTE	The transmitter was setup to transmit at the highest channel and the field strength was measured at 2483.5-2500 MHz.		

Polarization: Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2483.500	24.02	32.09	56.11	74.00	-17.89	peak	
2	*	2483.500	12.26	32.09	44.35	54.00	-9.65	AVG	



9 NUMBER OF HOPPING FREQUENCY

9.1 LIMIT

Test Item	Frequency Range (MHz)	Limit
Number of Hopping Channel	2400-2483.5	shall use at least 15 channels

9.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 01, 2013

NOTE: **N/A**: denotes No Model Name, No Serial No. or No Calibration specified.

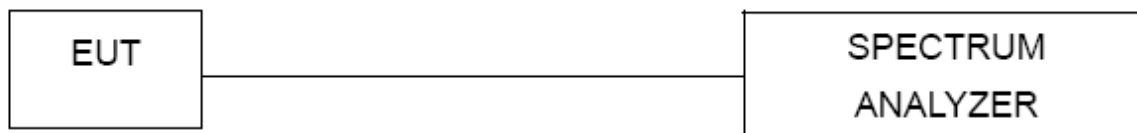
9.3 MEASURING INSTRUMENTS SETTING

Spectrum Analyzer	Parameter Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

9.4 TEST PROCEDURES

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- Spectrum Setting: RBW= 100 kHz, VBW=100 kHz, Sweep time = Auto.

9.5 TEST SETUP LAYOUT



9.6 DEVIATION FROM TEST STANDARD

No deviation

9.7 EUT OPERATING CONDITIONS

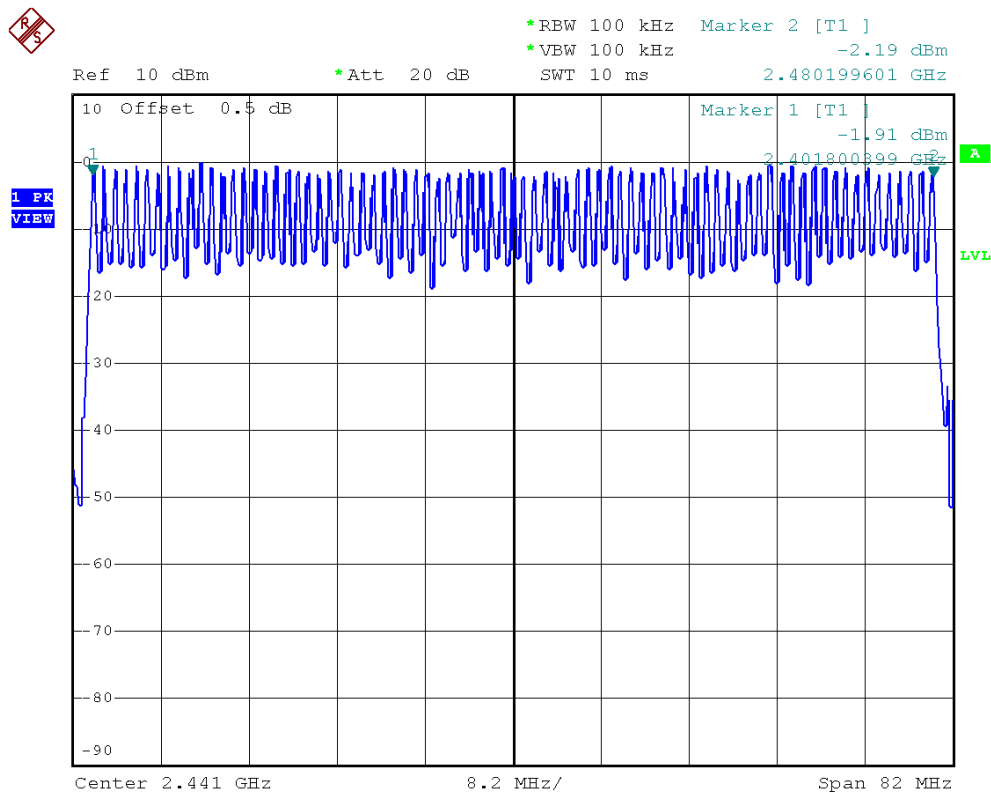
The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.



9.8 TEST RESULTS

E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps		

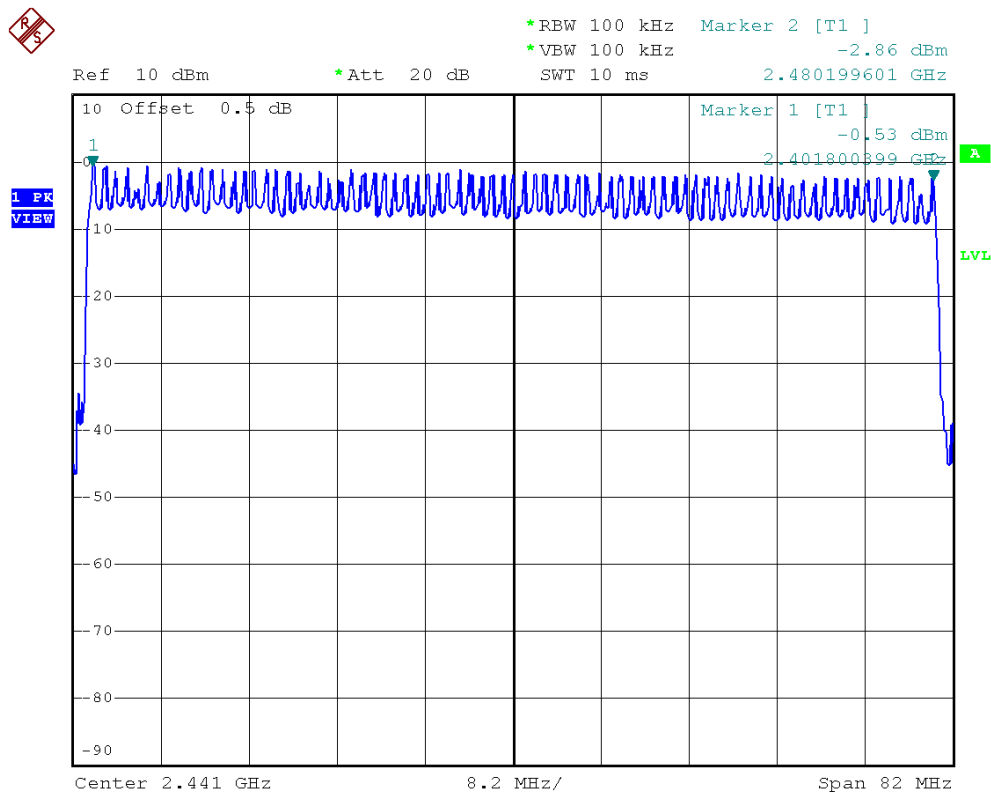
Number of Hopping Channel	Limit	Result
79	15	Pass





E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	60%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps		

Number of Hopping Channel	Limit	Result
79	15	Pass



**10 AVERAGE TIME OF OCCUPANCY****10.1 LIMIT**

Test Item	Frequency Range (MHz)	Limit
Average time of occupancy	2400-2483.5	shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

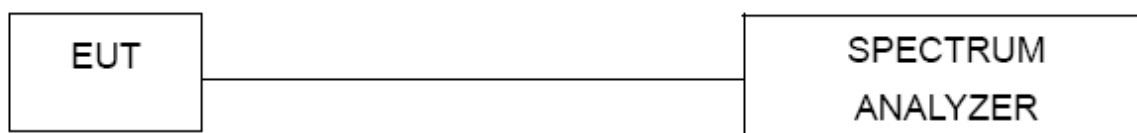
10.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 01, 2013

NOTE: **N/A**: denotes No Model Name, No Serial No. or No Calibration specified.

10.3 TEST PROCEDURES

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 100 kHz and VBW to 100 kHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.
- Set the EUT for DH5, DH3 and DH1 packet transmitting.
- Measure the maximum time duration of one single pulse.
- DH5 Packet permit maximum $1600 / 79 / 6 = 3.37$ hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $3.37 \times 31.6 = 106.6$ within 31.6 seconds.
- DH3 Packet permit maximum $1600 / 79 / 4 = 5.06$ hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds.
- DH1 Packet permit maximum $1600 / 79 / 2 = 10.12$ hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $10.12 \times 31.6 = 320$ within 31.6 seconds.

10.4 TEST SETUP LAYOUT**10.5 DEVIATION FROM TEST STANDARD**

No deviation



10.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

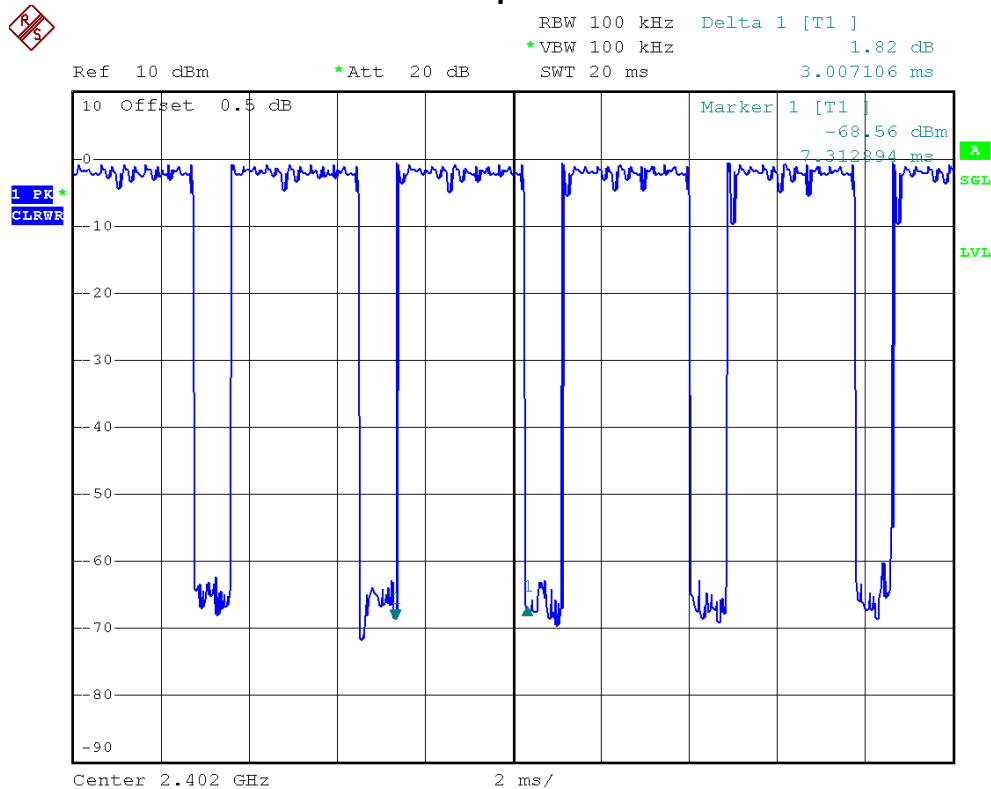


10.7 TEST RESULTS

E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2402 MHz		

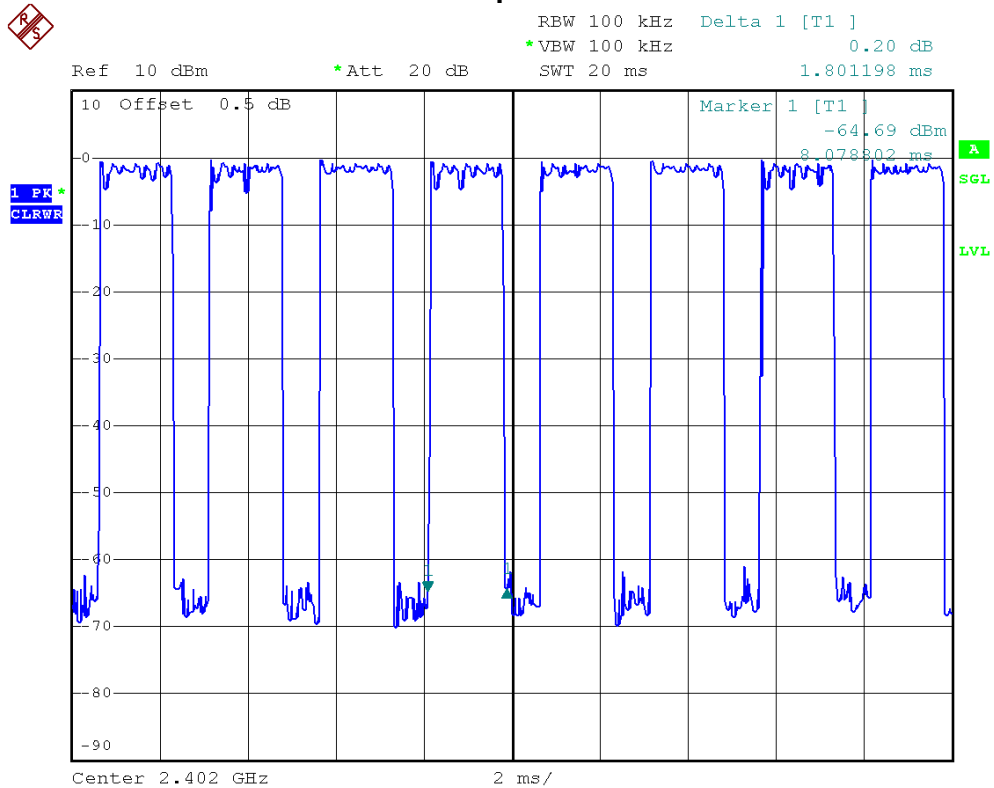
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Result
DH5	2402 MHz	3.0071	0.3208	0.4	PASS
DH3	2402 MHz	1.8012	0.2882	0.4	PASS
DH1	2402 MHz	0.4811	0.1540	0.4	PASS

Bluetooth/1 Mbps/2402 MHz/DH5

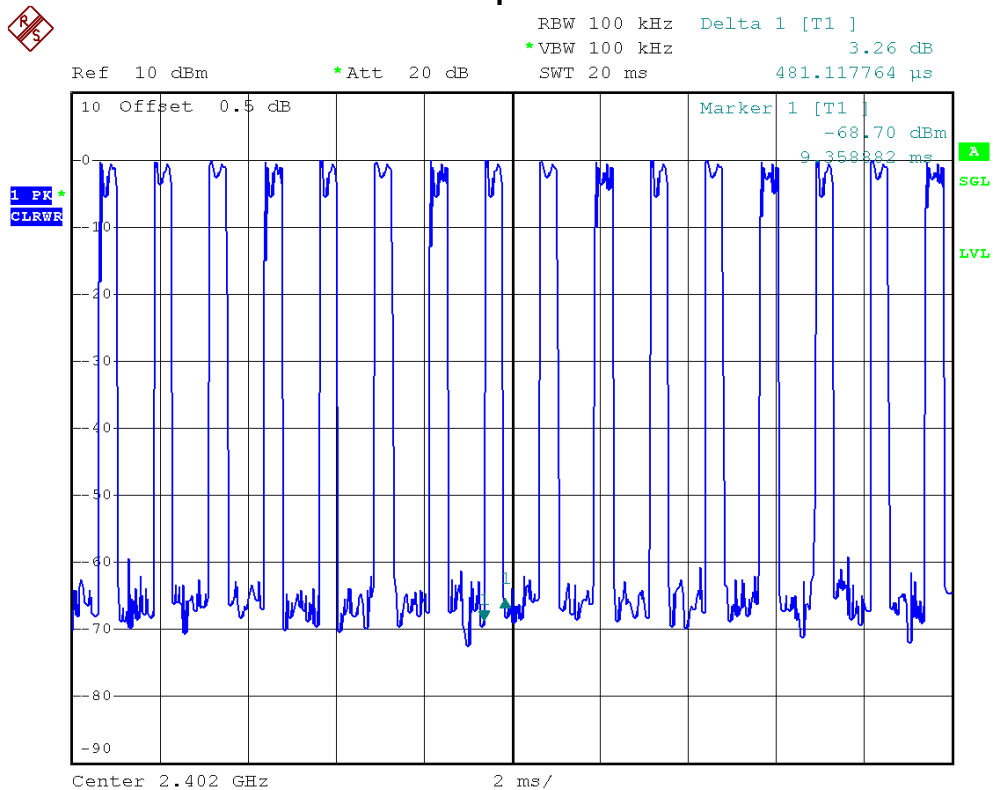




Bluetooth/1 Mbps/2402 MHz/DH3



Bluetooth/1 Mbps/2402 MHz/DH1

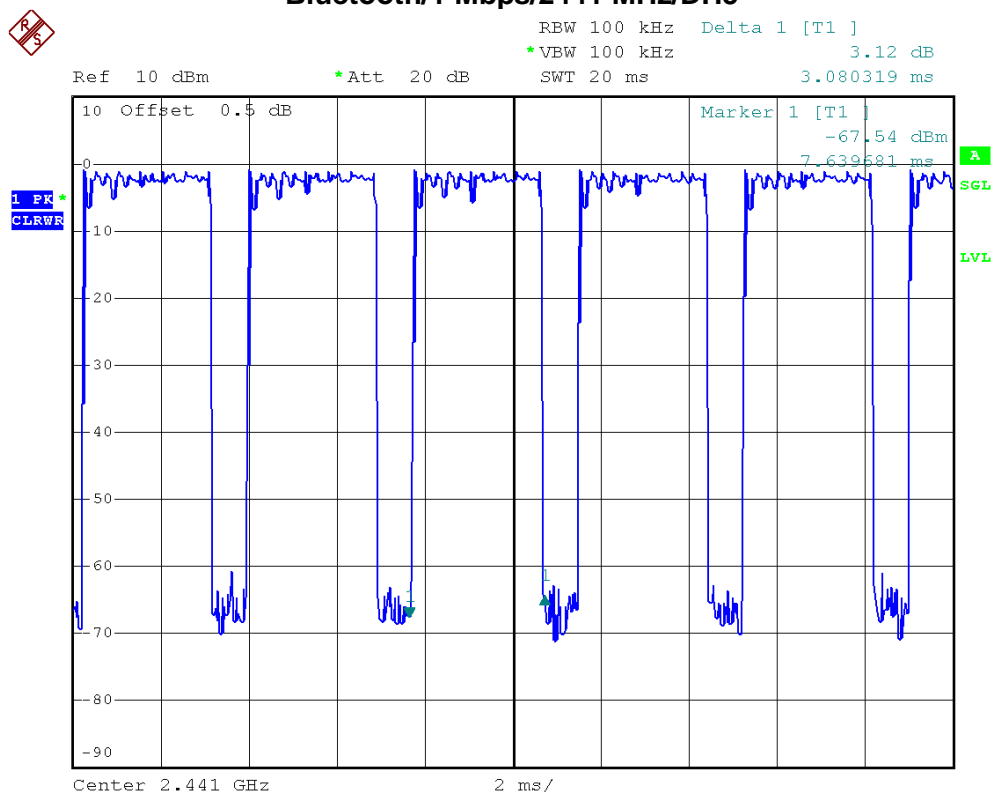




E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2441 MHz		

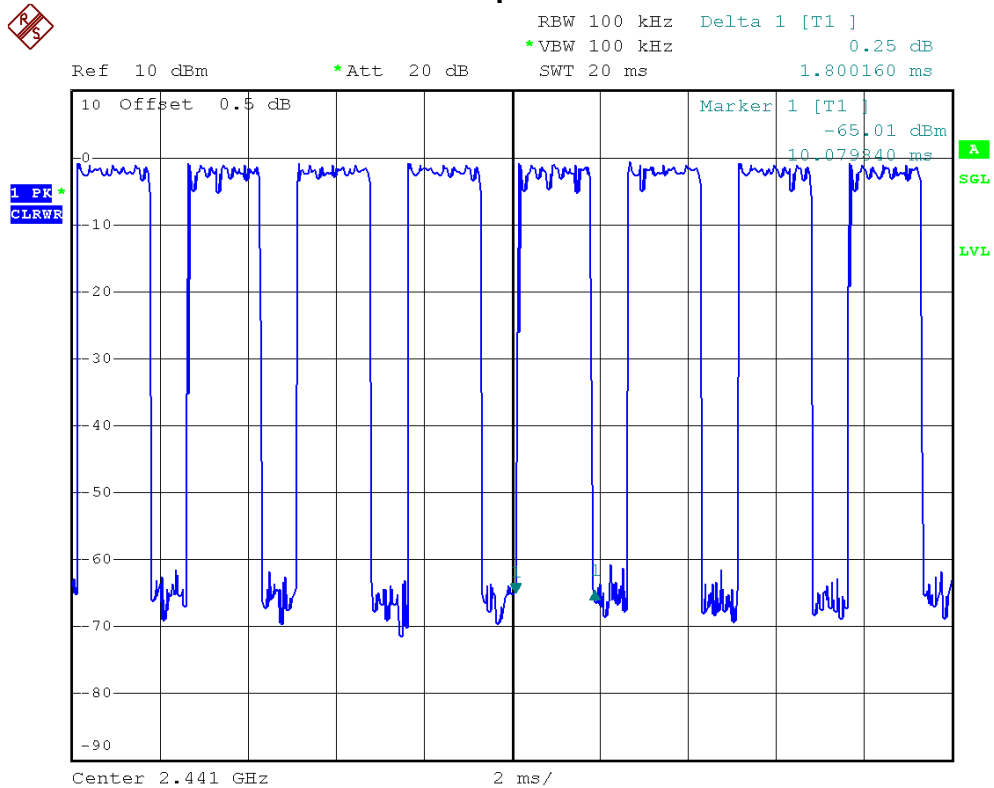
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Result
DH5	2441 MHz	3.0803	0.3286	0.4	PASS
DH3	2441 MHz	1.8002	0.2880	0.4	PASS
DH1	2441 MHz	0.5223	0.1671	0.4	PASS

Bluetooth/1 Mbps/2441 MHz/DH5

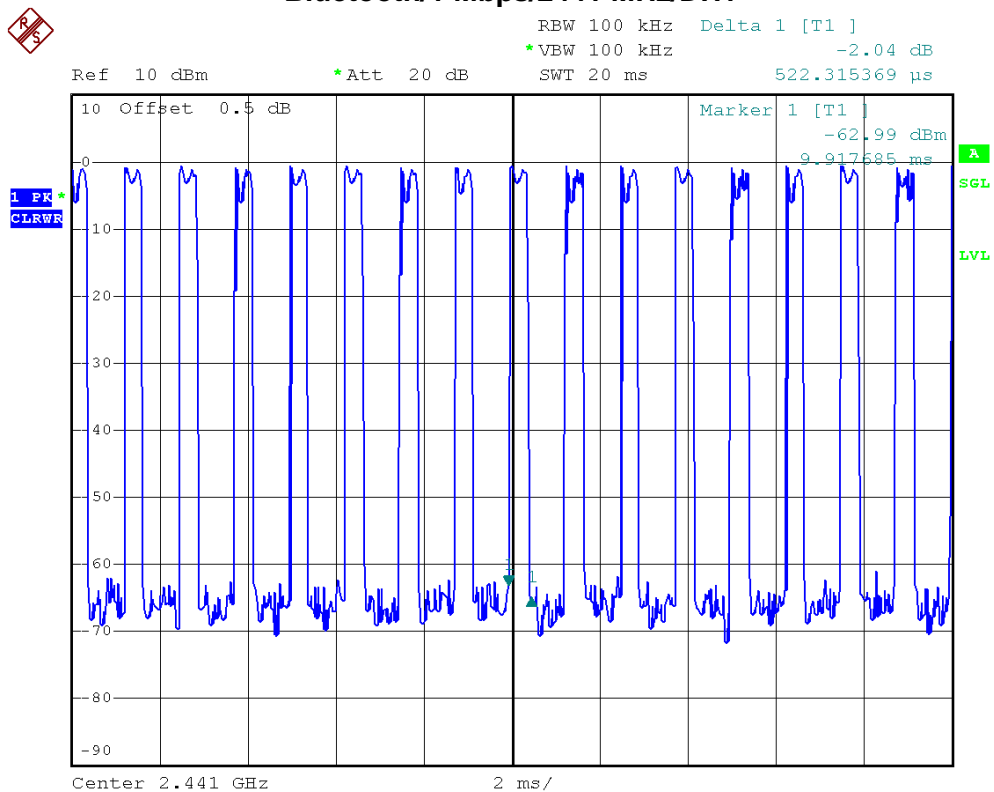




Bluetooth/1 Mbps/2441 MHz/DH3



Bluetooth/1 Mbps/2441 MHz/DH1

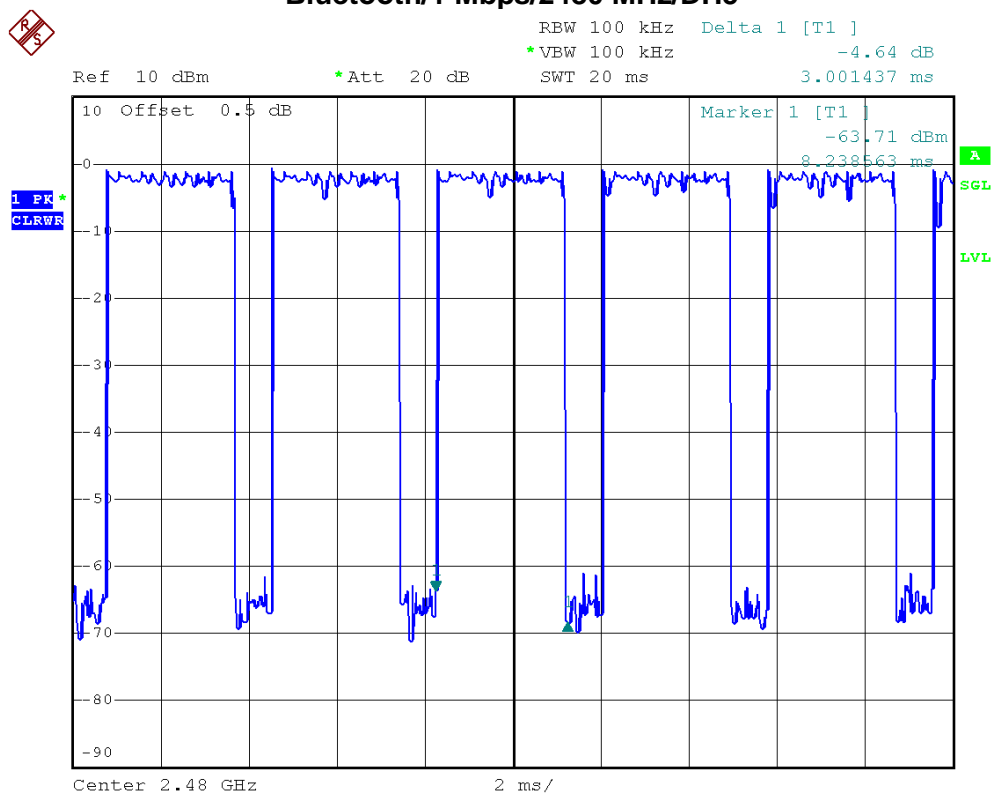




E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/1 Mbps/2480 MHz		

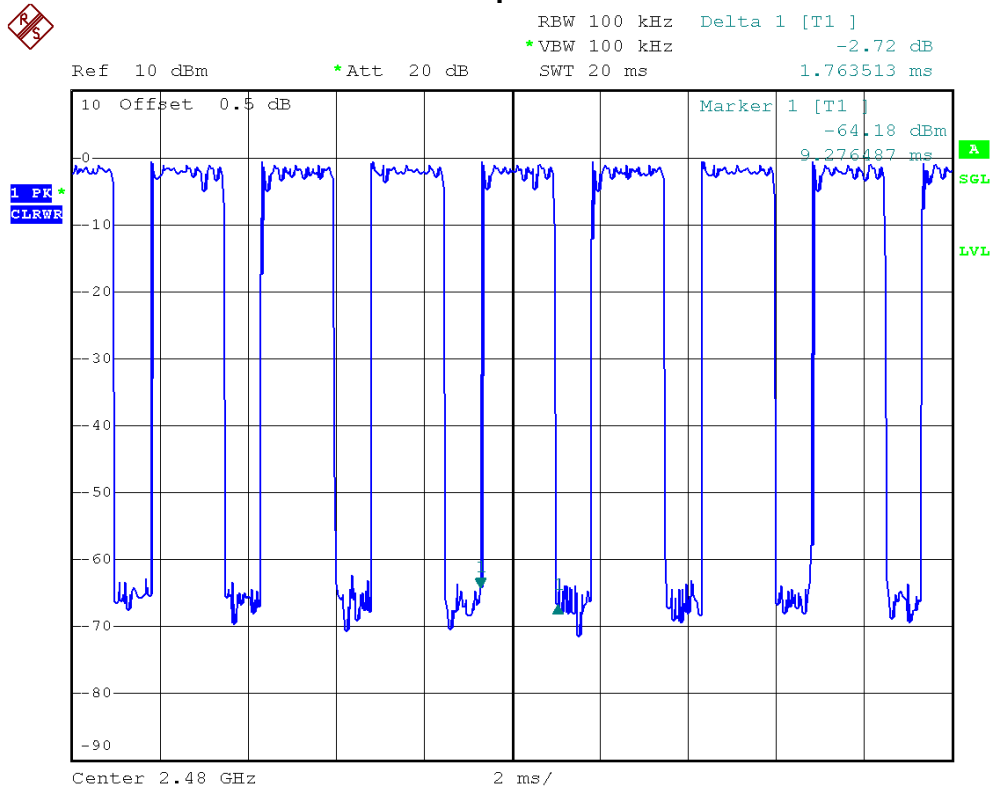
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Result
DH5	2480 MHz	3.0014	0.3202	0.4	PASS
DH3	2480 MHz	1.7635	0.2822	0.4	PASS
DH1	2480 MHz	0.5208	0.1667	0.4	PASS

Bluetooth/1 Mbps/2480 MHz/DH5

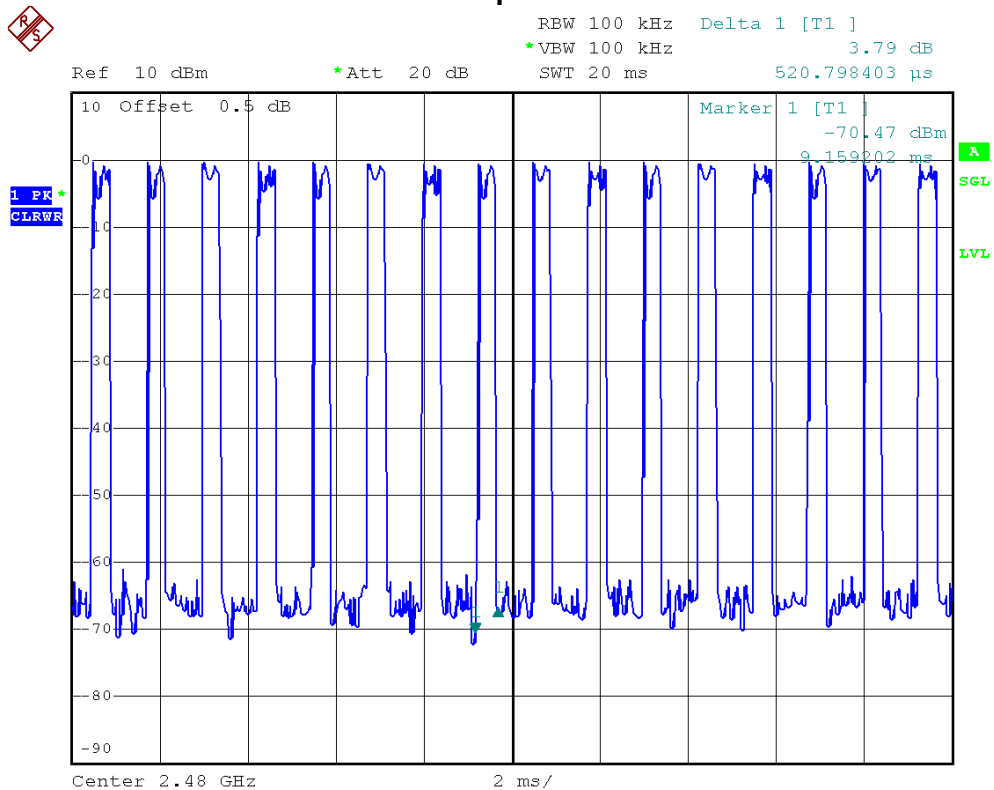




Bluetooth/1 Mbps/2480 MHz/DH3



Bluetooth/1 Mbps/2480 MHz/DH1

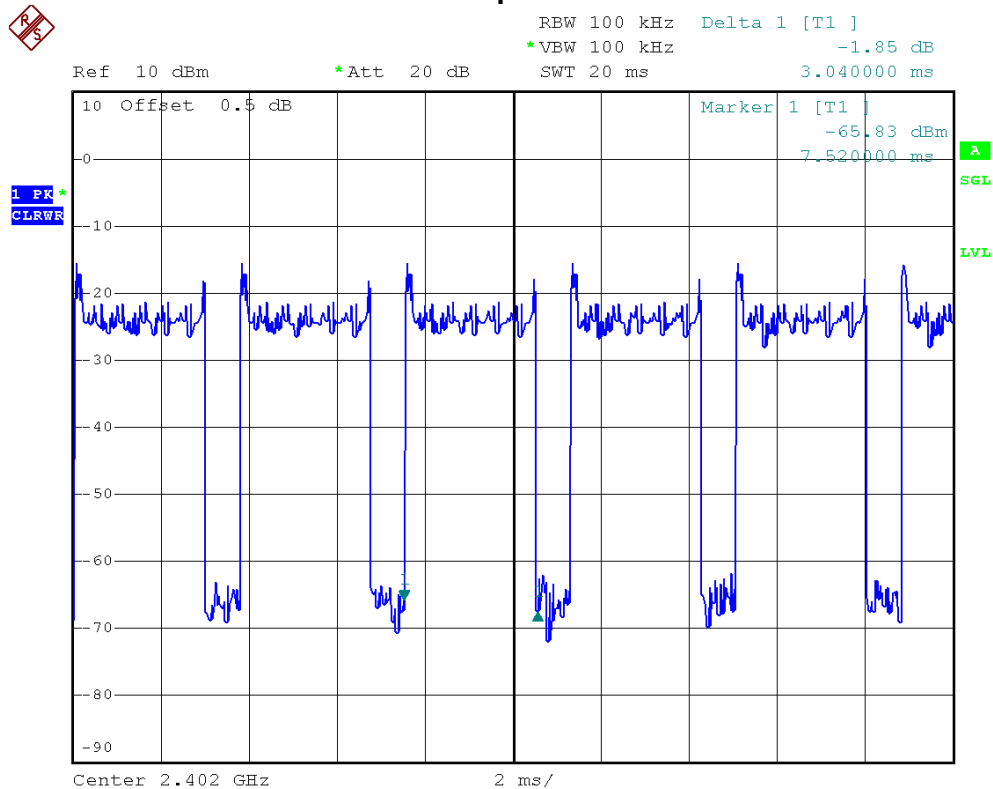




E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2402 MHz		

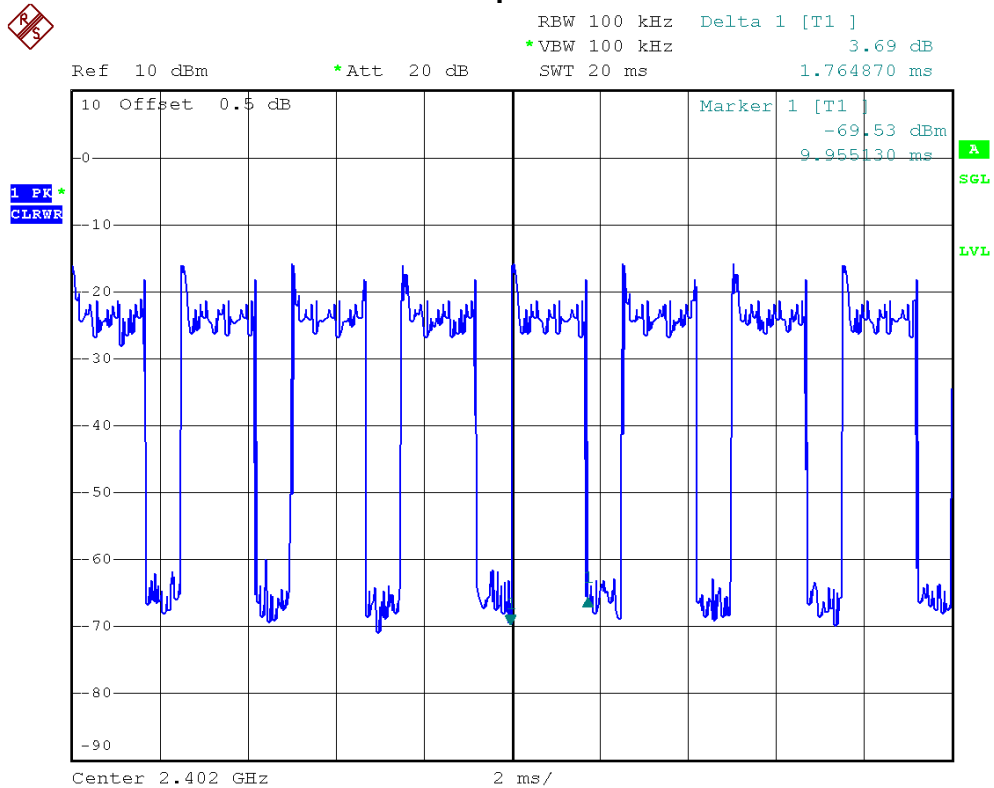
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Result
DH5	2402 MHz	3.0400	0.3243	0.4	PASS
DH3	2402 MHz	1.7649	0.2824	0.4	PASS
DH1	2402 MHz	0.5200	0.1664	0.4	PASS

Bluetooth/3 Mbps/2402 MHz/DH5

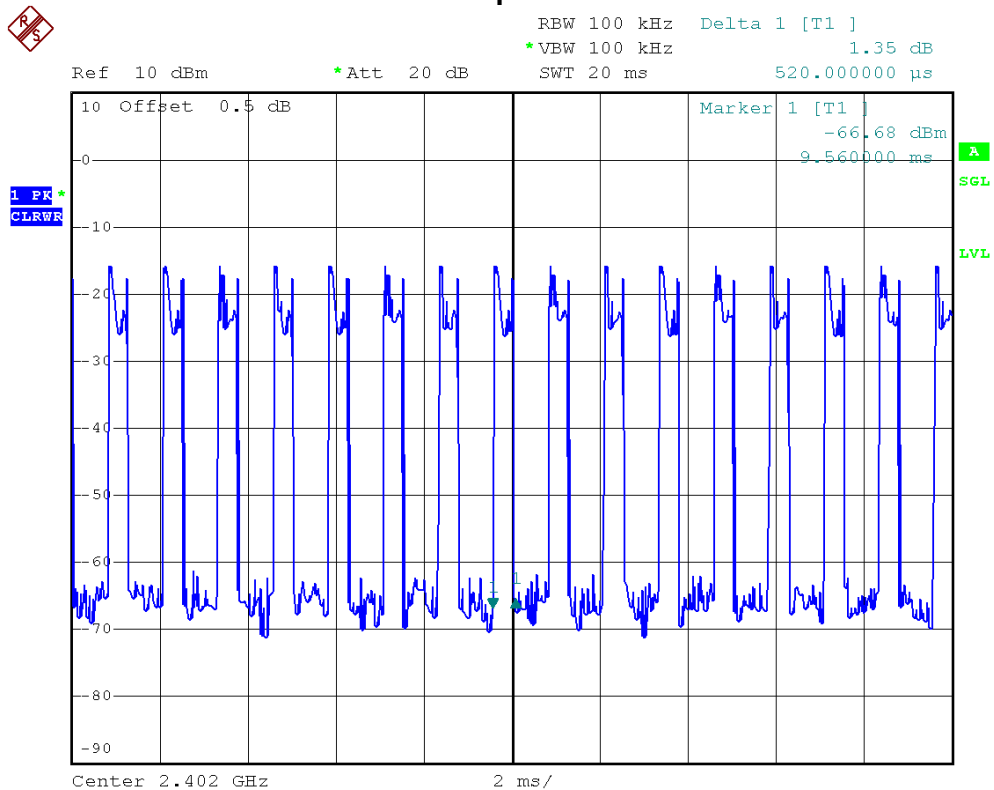




Bluetooth/3 Mbps/2402 MHz/DH3



Bluetooth/3 Mbps/2402 MHz/DH1

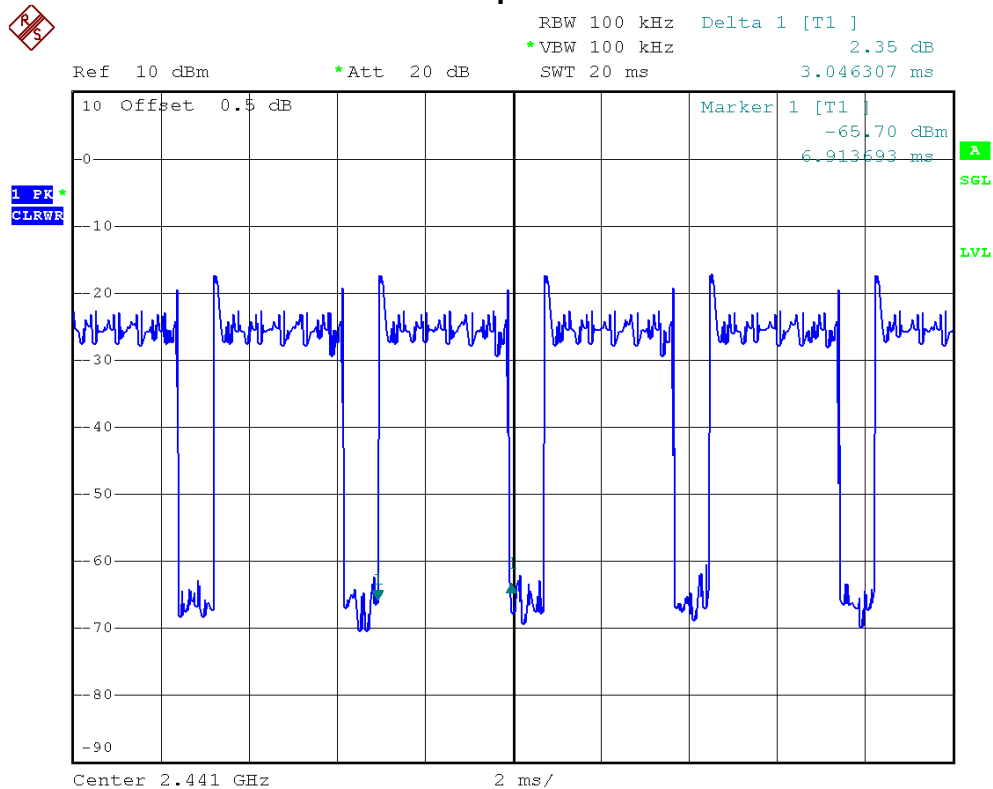




E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2441 MHz		

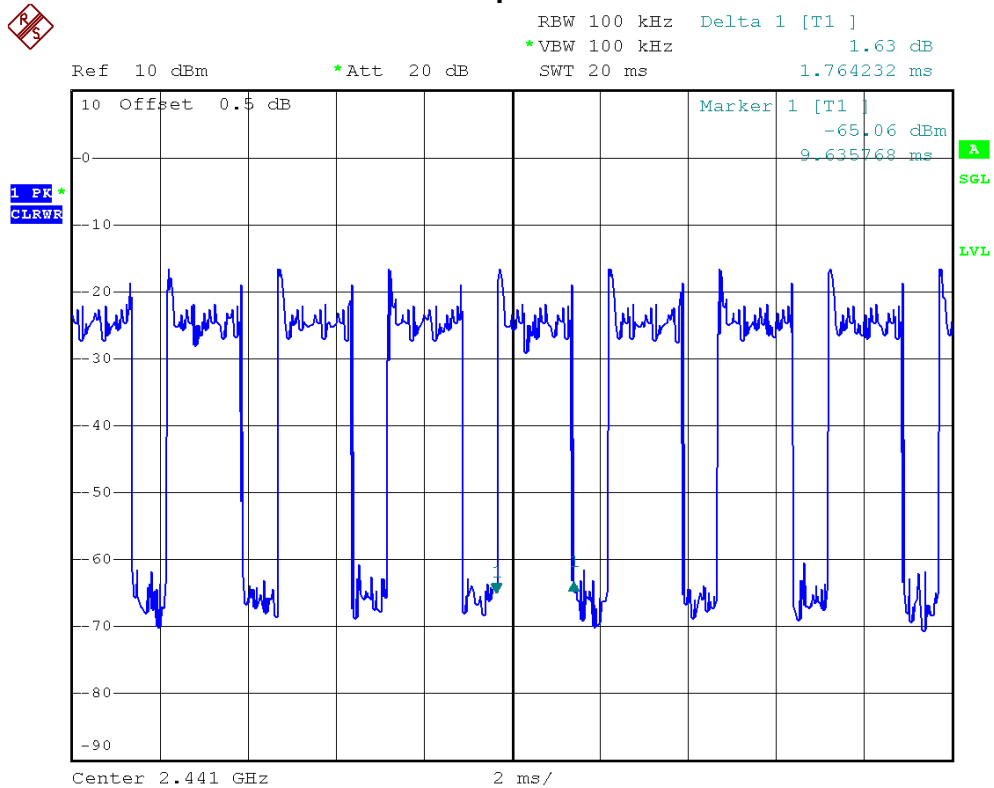
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Result
DH5	2441 MHz	3.0473	0.3250	0.4	PASS
DH3	2441 MHz	1.7642	0.2823	0.4	PASS
DH1	2441 MHz	0.5221	0.1671	0.4	PASS

Bluetooth/3 Mbps/2441 MHz/DH5

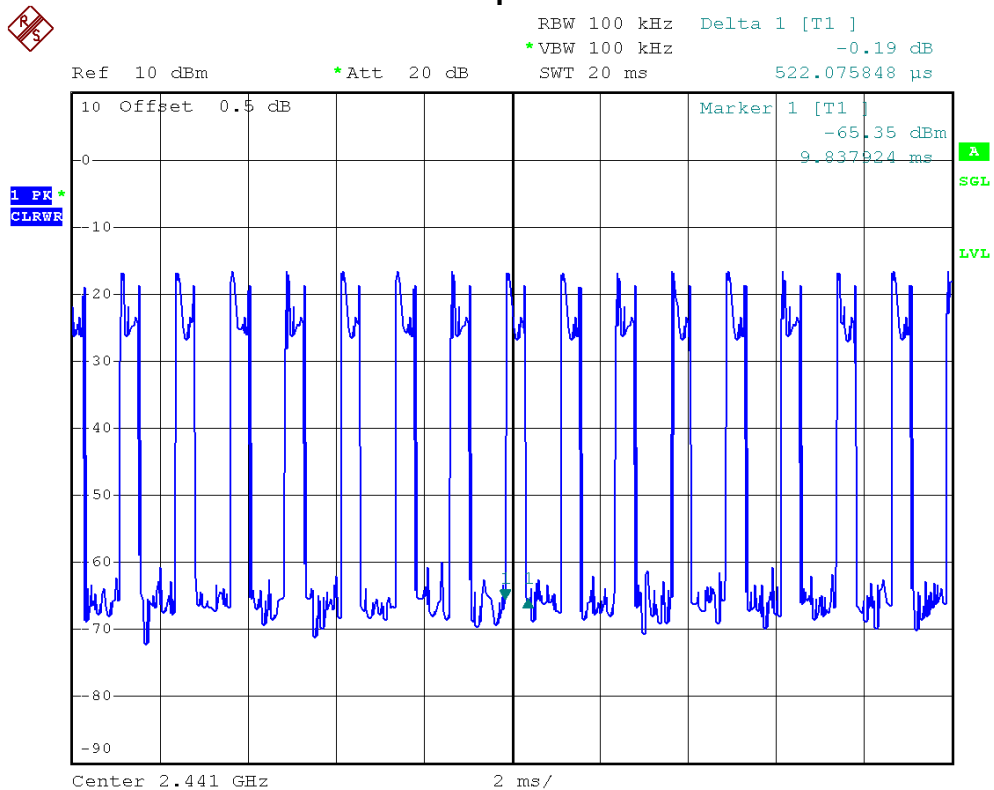




Bluetooth/3 Mbps/2441 MHz/DH3



Bluetooth/3 Mbps/2441 MHz/DH1

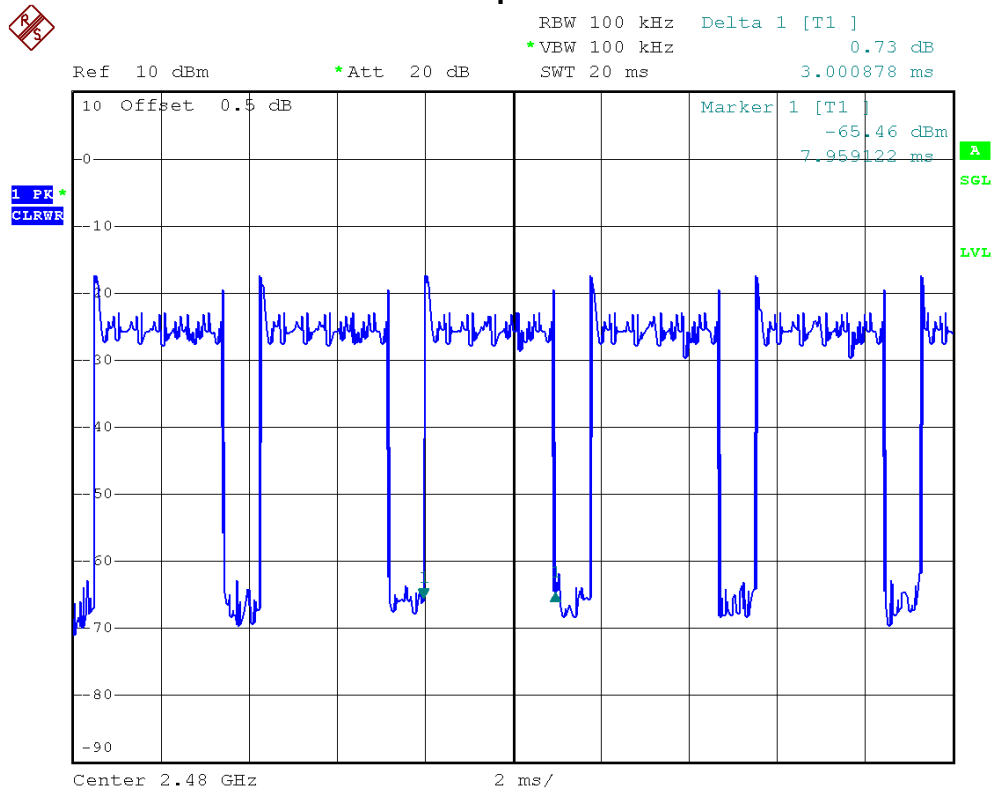




E.U.T	RF Module	Model Name	R8001
Temperature	26°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz (System)		
Test Mode	Bluetooth/3 Mbps/2480 MHz		

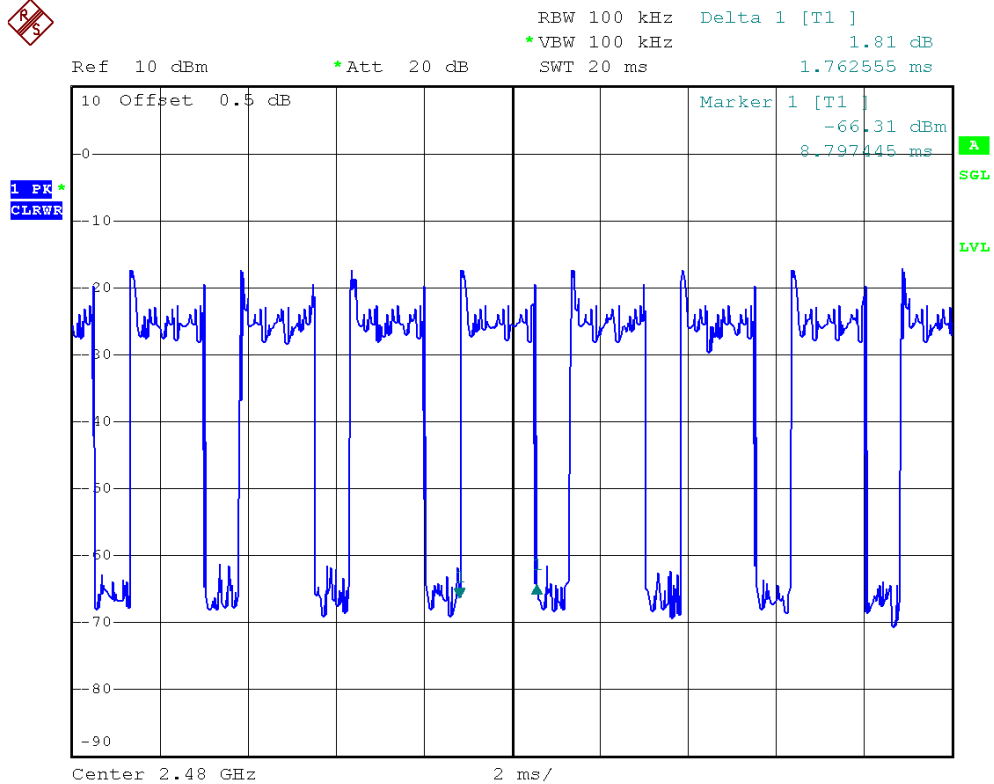
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Result
DH5	2480 MHz	3.0009	0.3201	0.4	PASS
DH3	2480 MHz	1.7626	0.2820	0.4	PASS
DH1	2480 MHz	0.5202	0.1665	0.4	PASS

Bluetooth/3 Mbps/2480 MHz/DH5





Bluetooth/3 Mbps/2480 MHz/DH3



Bluetooth/3 Mbps/2480 MHz/DH1

