



Bluetooth Radio Test Report

FCC ID: V3DR8000

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

Issued Date : Aug. 24, 2012

Project No. : 1206144

Equipment : RF Module

Model Name : R8000

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: Jun. 20, 2012

Date of Test: Jun. 20, 2012 ~ Jul. 11, 2012

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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.**

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REPORT ISSUED HISTORY

Revised Version No.	Description	Issued Date
-	Initial Issue.	Jul. 24, 2012
RV-1208014	1. Changed model name. 2. Change FCC ID.	Aug. 24, 2012



1. CERTIFICATION

Equipment: RF Module
Brand Name: Riotec
Model Name: R8000
Applicant: RIOTEC Co., Ltd.
Date of Test: Jun. 20, 2012 ~ Jul. 11, 2012
Standards: FCC Part15, Subpart C: 2010 / ANCI 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-1-1206144) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).

**2. SUMMARY OF TEST RESULTS**

Test procedures according to the technical standards:

Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.247 (c)	Antenna conducted Spurious Emission	PASS	
15.247 (a)(1)	Hopping Channel Separation	PASS	
15.247 (b)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (b)(1)	Number of Hopping Frequency	PASS	
15.247 (a)(1)	Dwell Time	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:

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.

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	R8000	
OEM Brand/Model Name	N/A	
Model Difference	N/A	
Product Description	The EUT is a RF Module.	
	Operation Frequency:	2402~2480 MHz
	Modulation Type:	FHSS(GFSK)
	Bit Rate of Transmitter:	1/3 Mbps
	Number Of Channel	Please see Note 2.
	Antenna Designation:	Please see Note 3.
	Antenna Gain(Peak)	Please see Note 3.
	Maximum Peak Output Power:	1 Mbps: -0.37 dBm 3 Mbps: -2.17 dBm
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Power Source	Supplied from system.	
Power Rating	1. I/P: DC 3.3V	
Products Covered	Please refer to the User's Manual	
Connecting I/O Port(s)	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. Bluetooth:

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	N/A	N/A	PCB	N/A	1.00



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.

Pretest Test Mode	Description
Mode 1	Bluetooth / 1 Mbps / CH00, CH39, CH78
Mode 2	Bluetooth / 3 Mbps / CH00, CH39, CH78

For Radiated Emission (30MHz – 1000MHz)	
Final Test Mode	Description
Mode 2	Bluetooth / 1 Mbps / CH39

For Radiated Emission (Above 1000MHz)	
Final Test Mode	Description
Mode 2	Bluetooth / 1 Mbps / CH00, CH39, CH78
Mode 3	Bluetooth / 3 Mbps / CH00, CH39, CH78

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

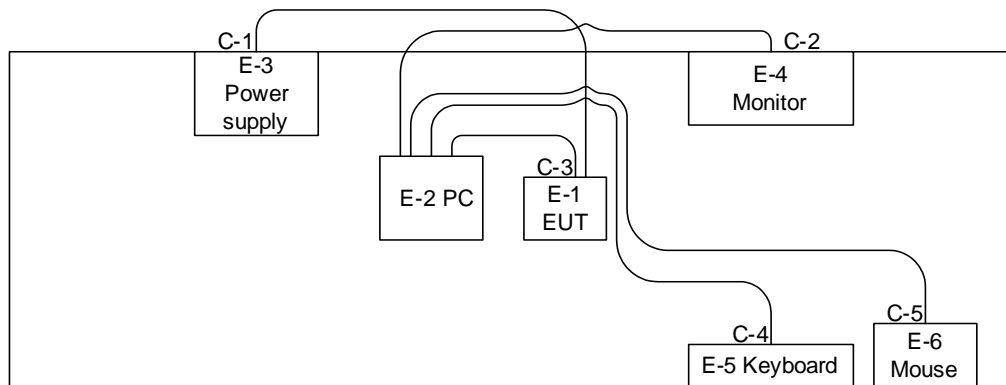
**3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING**

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 power parameters of FHSS

Data Rate	1 Mbps		
Test software Version	Bluetooth test		
Frequency	2402 MHz	2441 MHz	2480 MHz
Power Parameters	63	55	63

Data Rate	3 Mbps		
Test software Version	Bluetooth test		
Frequency	2402 MHz	2441 MHz	2480 MHz
Power Parameters	120	120	95

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



C-1 DC power Cable
C-2 D-SUB Cable
C-3 DATA Cable
C-4 PS/2 Cable
C-5 PS/2 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	R8000	V3DR8000	N/A	EUT
E-2	PC	HP	xw8200	DOC	SGH50402C3	
E-3	DC Power Supply	GOOD WILL	GPC-3030D	N/A	B710591	
E-4	24" LCD Monitor	DELL	U2410f	DOC	CN-OJ257M-72872-09J-067L	
E-5	PS/2 K/B	Logitech	Y-SJ17(ACK260A)	DOC	SYU44664880	
E-6	PS/2 Mouse	Logitech	M-SBF69	DOC	HCA44601156	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.2M	
C-2	YES	YES	1.8M	
C-3	NO	NO	0.4M	
C-4	YES	NO	1.5M	
C-5	YES	NO	1.7M	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) " ※ " denotes the support equipment by applicant.



4. EMC EMISSION TEST

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 RADIATED EMISSION LIMITS (Frequency Range 9KHz-1000MHz)

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.

Frequencies (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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

- (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



4.1.2 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 06, 2012
2	Horn Antenna	Schwarzbeck	BBHA 9120	D-325	Dec. 15, 2012
3	Microwave Pre-amplifier	Agilent	8449B	3008A01714	Apr. 17, 2013
4	Microflex Cable	N/A	N/A	1m	May. 14, 2013
5	Microflex Cable	AISI	S104-SMAP-1	10m	May. 14, 2013
6	Microflex Cable	N/A	N/A	3m	May. 14, 2013
7	Test Cable	N/A	LMR-400	966_12m	May. 15, 2013
8	Test Cable	N/A	LMR-400	966_3m	May. 15, 2013
9	Pre-Amplifier	EMC	EMC-330	980001	Jun. 07, 2013
10	Log-Bicon Antenna	Schwarzbeck	VULB9168-352	9168-352	Jun. 12, 2013
11	Horn Antenna	Schwarzbeck	BBHA 9170	187	Dec. 18, 2012
12	Horn Antenna	Schwarzbeck	BBHA 9120	D-546	Jun. 18, 2013

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

Spectrum 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)	100KHz / 100KHz for peak

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



4.1.3 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. 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.
- d. 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.
- e. 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.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.
- g. The testing follows the guidelines in ANSI C63.4: 2009 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: (30-1000MHz)

- a. Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode with Detector BW=120 kHz.
- b. 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.

NOTE: (Above 1000MHz)

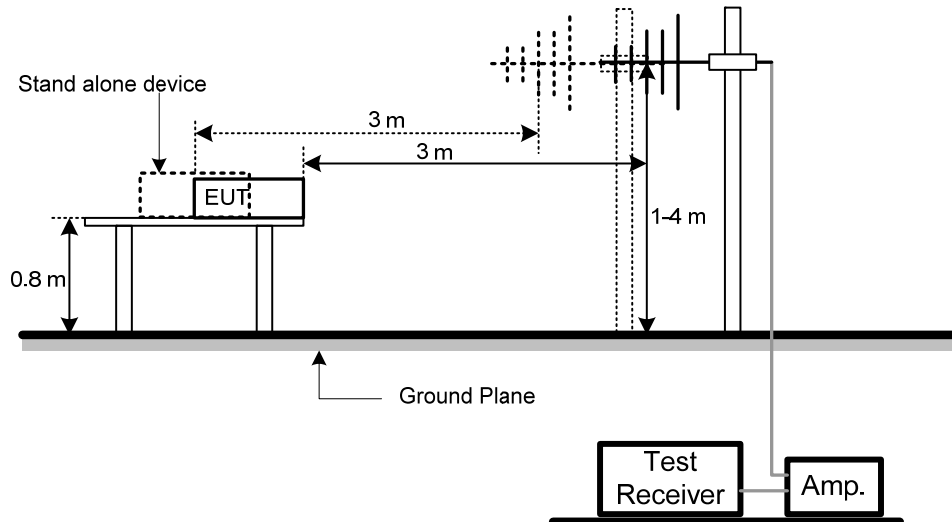
- a. Reading in which marked as Peak means measurements by using are Peak Mode with instrument setting in RBW= 1 MHz, VBW= 1 MHz.
Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW= 1 MHz, VBW= 10 Hz.
- b. All readings are Peak Mode value unless 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.

4.1.4 DEVIATION FROM TEST STANDARD

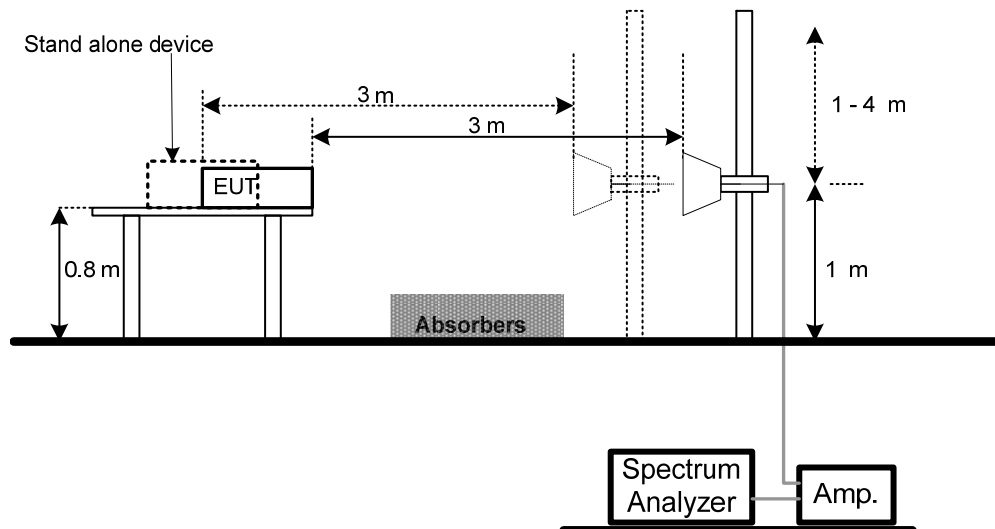
No deviation

4.1.5 TEST SETUP

Below 1 GHz



Above 1 GHz



4.1.6 EUT OPERATING CONDITIONS

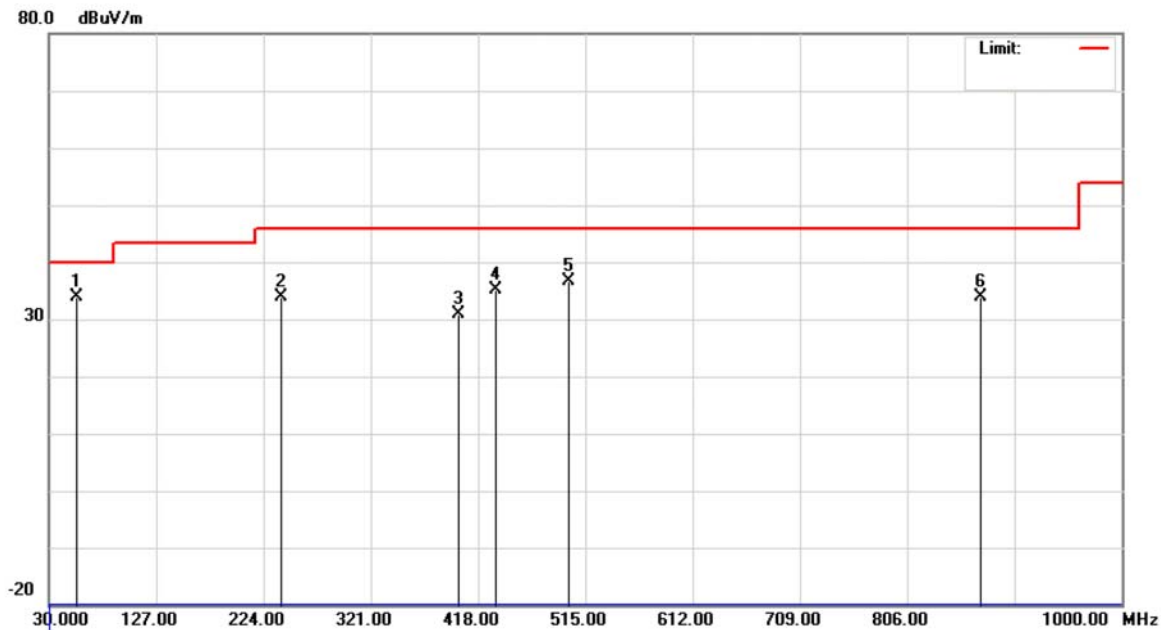
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



4.1.7 TEST RESULTS-BETWEEN 30MHZ - 1000MHZ - TX

EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 1 Mbps / CH39		

Polarization: Vertical

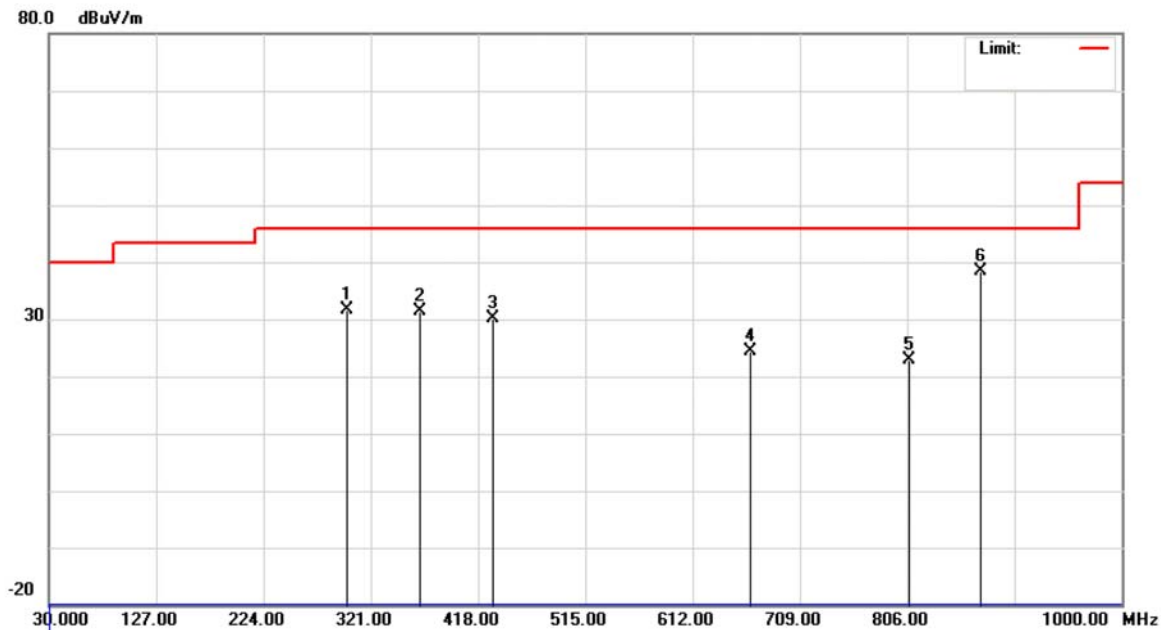


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	55.2200	53.35	-19.41	33.94	40.00	-6.06	peak	
2		239.5200	54.98	-21.14	33.84	46.00	-12.16	peak	
3		400.5400	46.69	-15.92	30.77	46.00	-15.23	peak	
4		433.5199	50.14	-15.12	35.02	46.00	-10.98	peak	
5		499.4800	50.45	-13.87	36.58	46.00	-9.42	peak	
6		871.9600	41.03	-7.24	33.79	46.00	-12.21	peak	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 1 Mbps / CH39		

Polarization: Horizontal



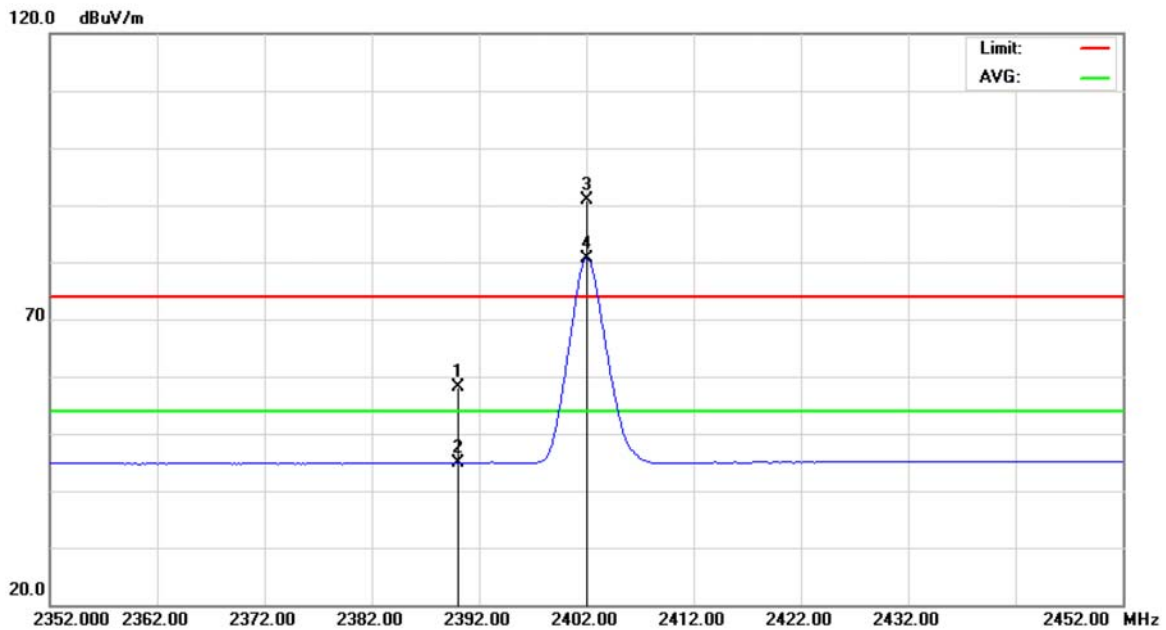
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		299.6600	50.58	-18.83	31.75	46.00	-14.25	peak	
2		365.6199	48.53	-17.11	31.42	46.00	-14.58	peak	
3		431.5799	45.38	-15.17	30.21	46.00	-15.79	peak	
4		664.3800	34.95	-10.64	24.31	46.00	-21.69	peak	
5		807.9400	31.31	-8.31	23.00	46.00	-23.00	peak	
6	*	871.9600	45.56	-7.24	38.32	46.00	-7.68	peak	



4.1.8 TEST RESULTS - ABOVE 1000MHZ - TX

EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH00		

Polarization: Vertical

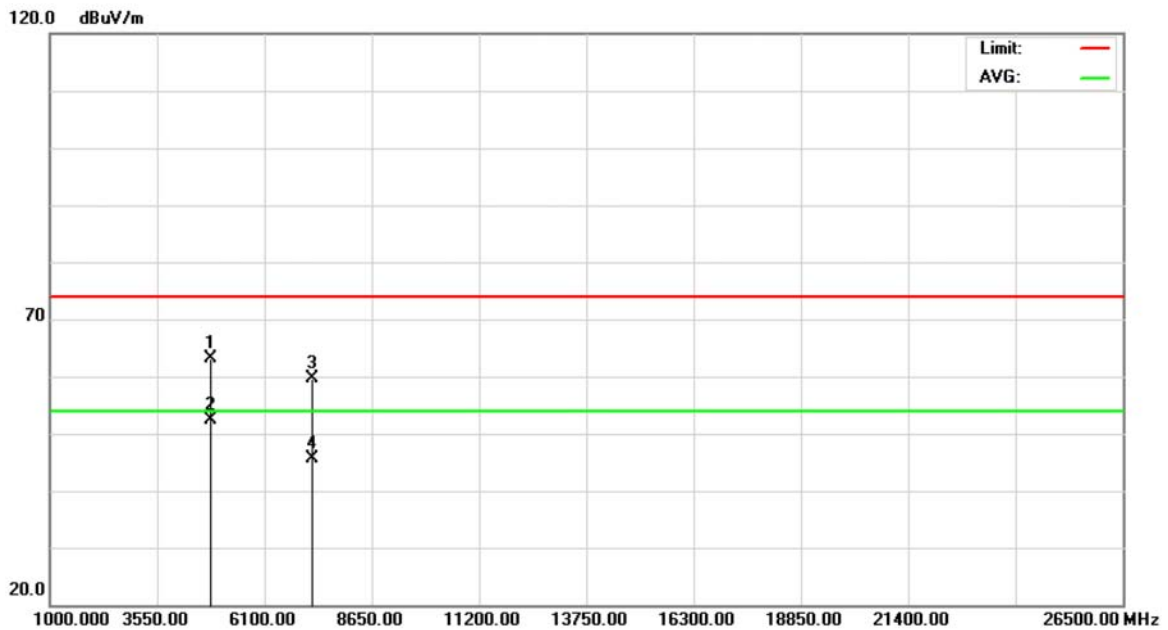


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	24.63	33.42	58.05	74.00	-15.95	peak	
2		2390.000	11.38	33.42	44.80	54.00	-9.20	AVG	
3	X	2402.000	57.46	33.49	90.95	74.00	16.95	peak	
4	*	2402.000	47.06	33.49	80.55	54.00	26.55	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH00		

Polarization: Vertical

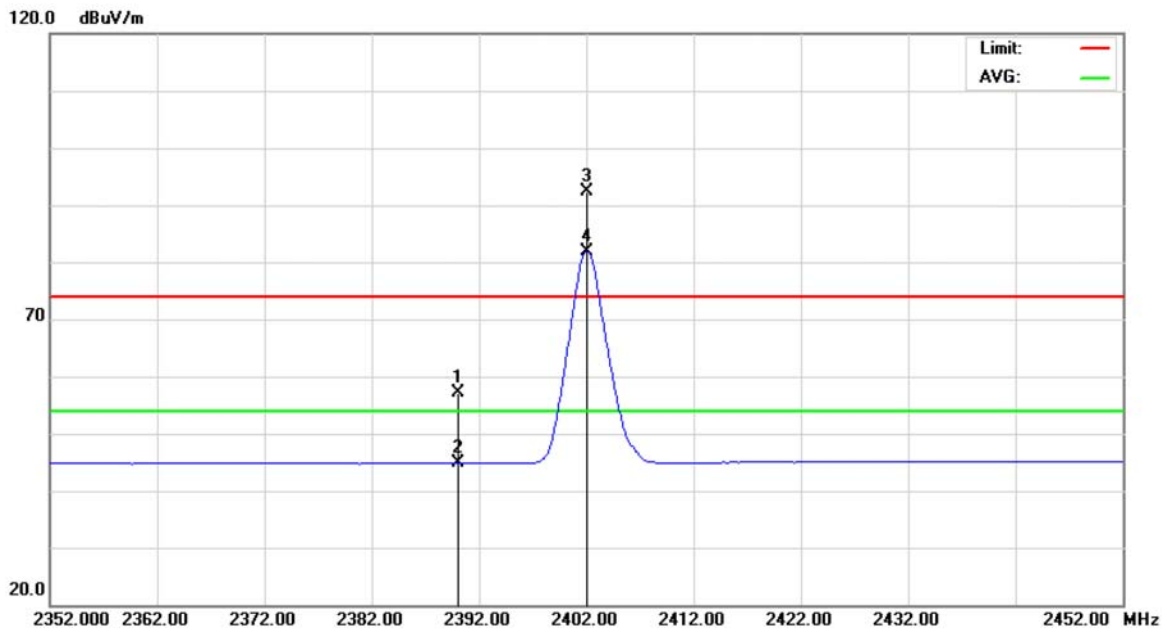


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.070	55.60	7.41	63.01	74.00	-10.99	peak	
2	*	4804.070	44.90	7.41	52.31	54.00	-1.69	AVG	
3		7206.230	44.75	14.79	59.54	74.00	-14.46	peak	
4		7206.230	30.93	14.79	45.72	54.00	-8.28	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH00		

Polarization: Horizontal

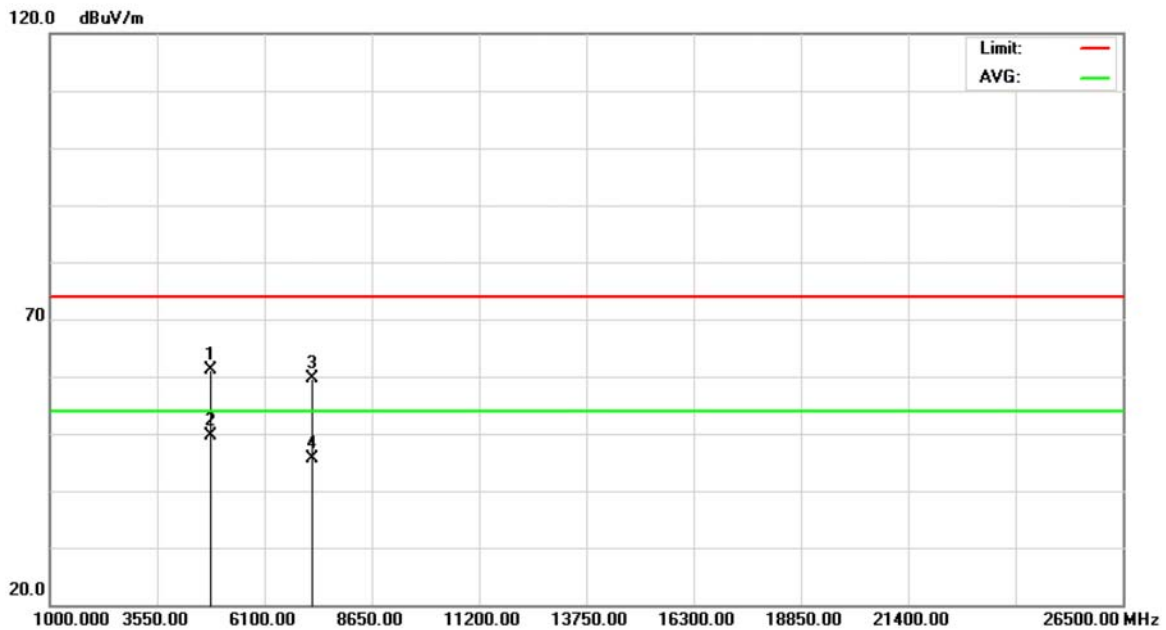


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	23.83	33.42	57.25	74.00	-16.75	peak	
2		2390.000	11.37	33.42	44.79	54.00	-9.21	AVG	
3	X	2402.000	58.87	33.49	92.36	74.00	18.36	peak	
4	*	2402.000	48.50	33.49	81.99	54.00	27.99	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH00		

Polarization: Horizontal

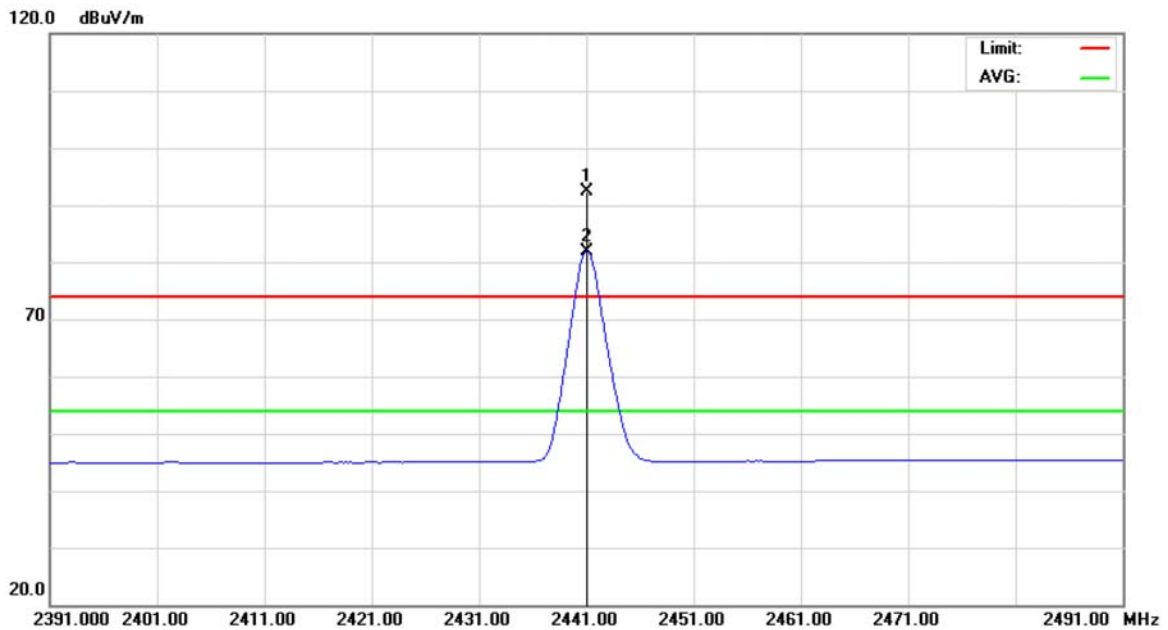


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.110	53.78	7.41	61.19	74.00	-12.81	peak	
2	*	4804.110	42.23	7.41	49.64	54.00	-4.36	AVG	
3		7206.250	44.74	14.79	59.53	74.00	-14.47	peak	
4		7206.250	30.91	14.79	45.70	54.00	-8.30	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH39		

Polarization: Vertical

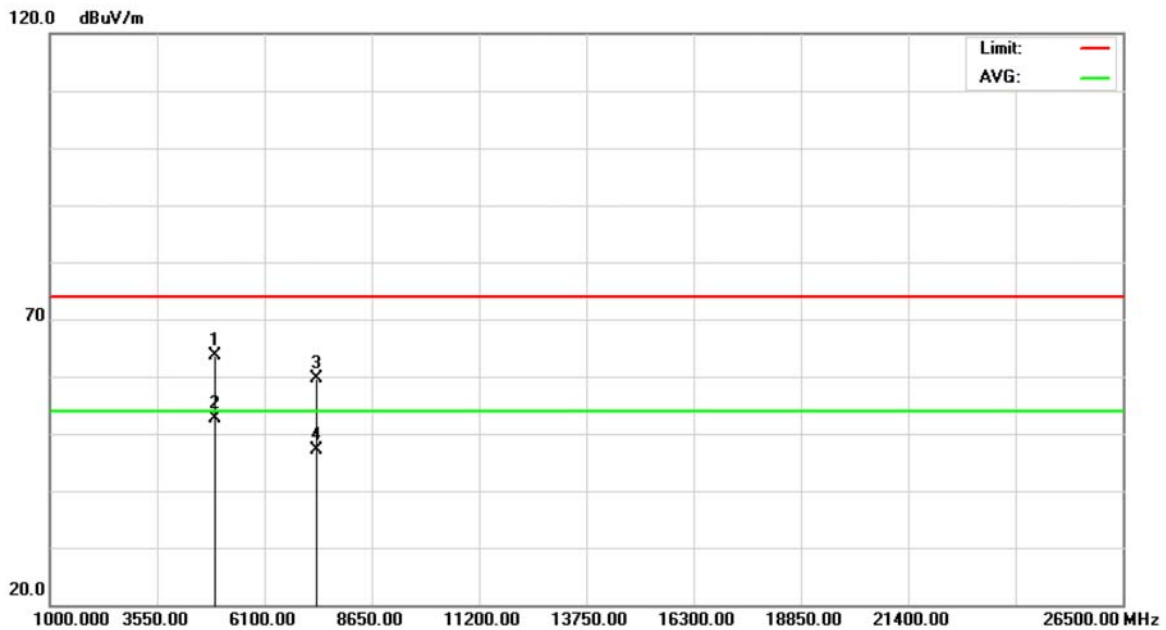


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2441.000	58.62	33.69	92.31	74.00	18.31	peak	
2	*	2441.000	48.24	33.69	81.93	54.00	27.93	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH39		

Polarization: Vertical

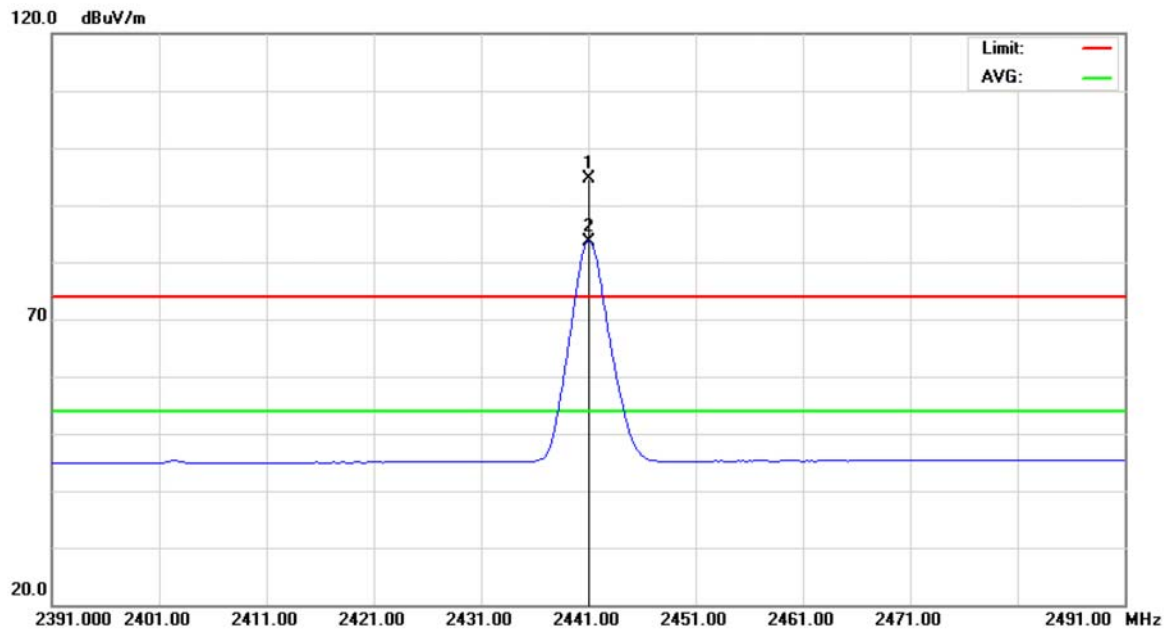


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4882.030	55.96	7.70	63.66	74.00	-10.34	peak	
2	*	4882.030	44.90	7.70	52.60	54.00	-1.40	AVG	
3		7322.790	44.48	15.10	59.58	74.00	-14.42	peak	
4		7322.790	31.98	15.10	47.08	54.00	-6.92	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH39		

Polarization: Horizontal

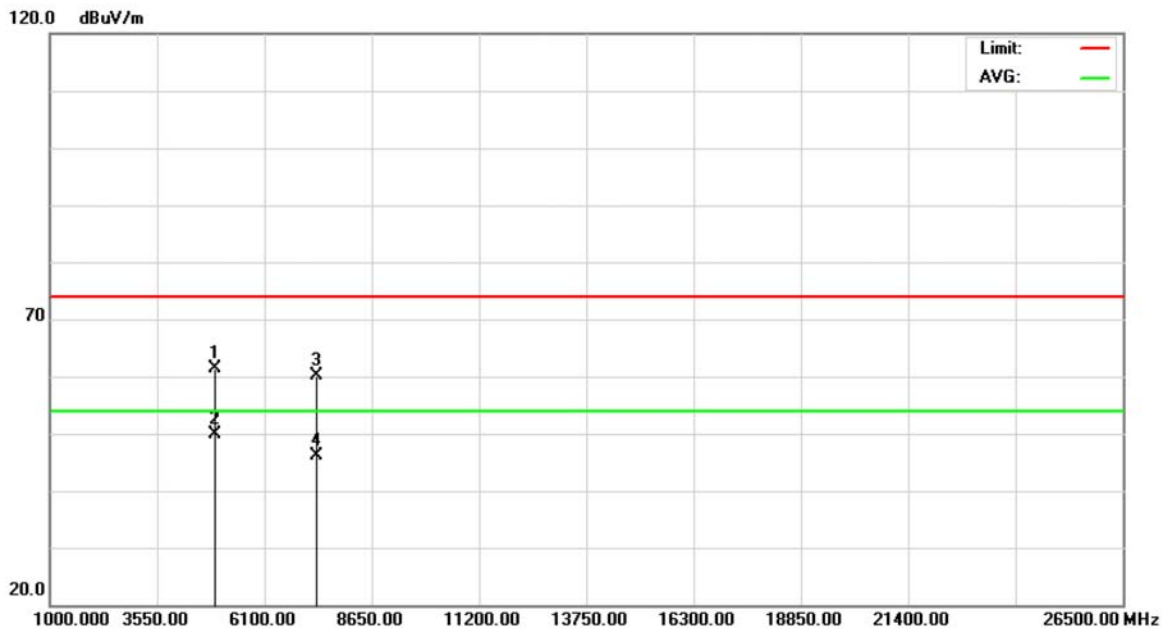


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2441.000	60.95	33.69	94.64	74.00	20.64	peak	
2	*	2441.000	50.02	33.69	83.71	54.00	29.71	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH39		

Polarization: Horizontal

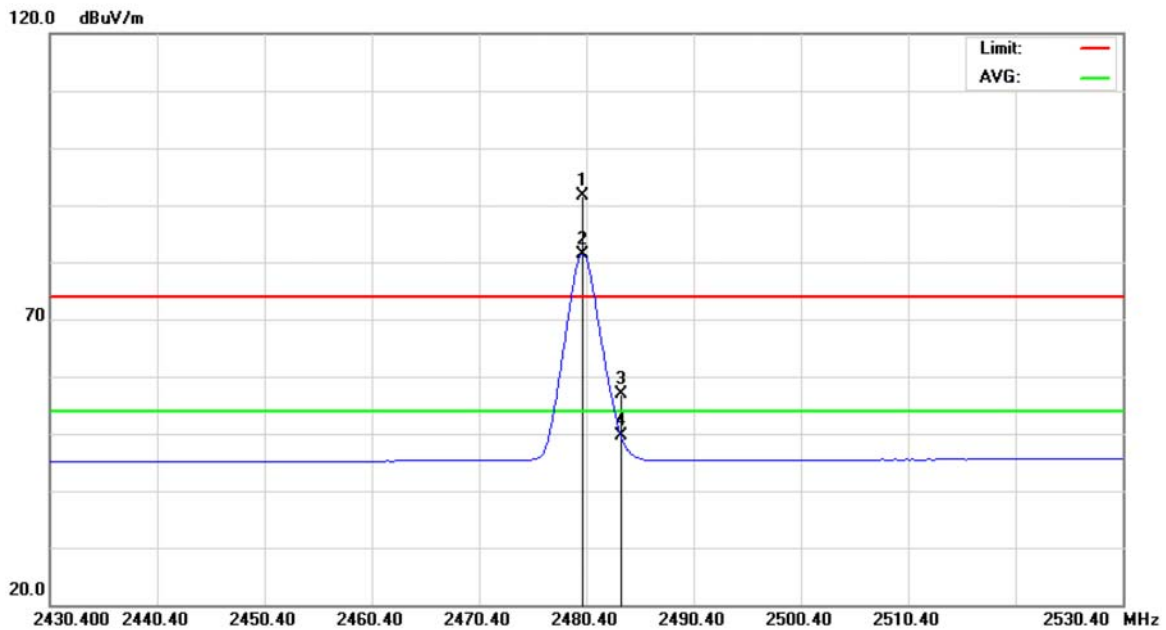


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4882.010	53.77	7.70	61.47	74.00	-12.53	peak	
2	*	4882.010	42.26	7.70	49.96	54.00	-4.04	AVG	
3		7323.620	44.97	15.10	60.07	74.00	-13.93	peak	
4		7323.620	31.01	15.10	46.11	54.00	-7.89	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH78		

Polarization: Vertical

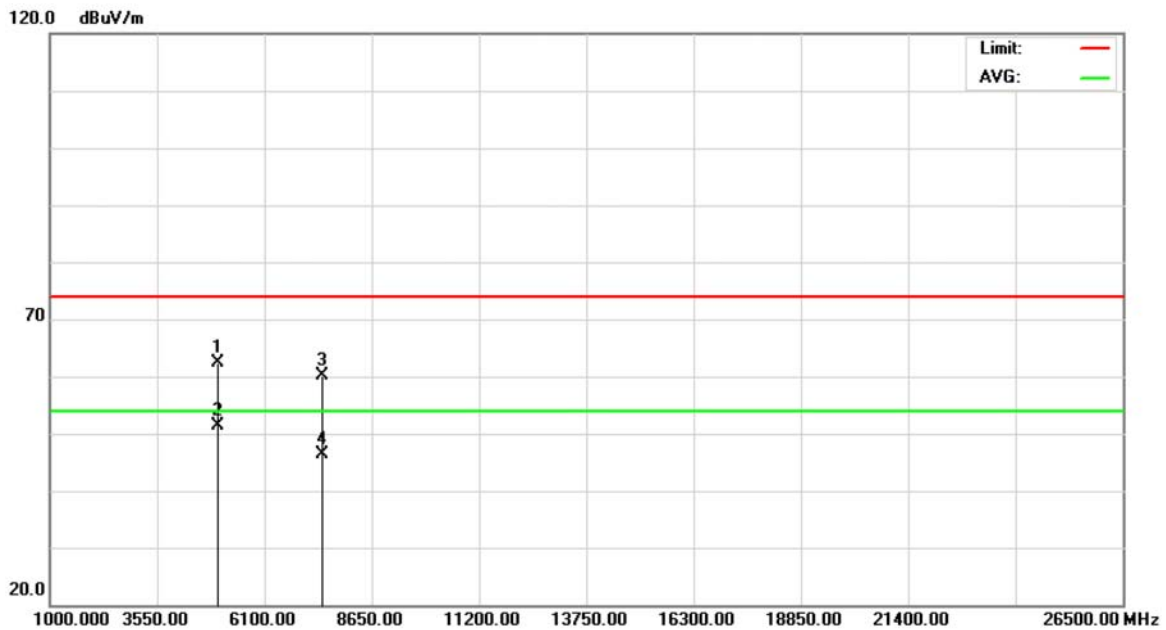


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	57.75	33.90	91.65	74.00	17.65	peak	
2	*	2480.000	47.41	33.90	81.31	54.00	27.31	AVG	
3		2483.500	22.89	33.92	56.81	74.00	-17.19	peak	
4		2483.500	15.70	33.92	49.62	54.00	-4.38	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH78		

Polarization: Vertical

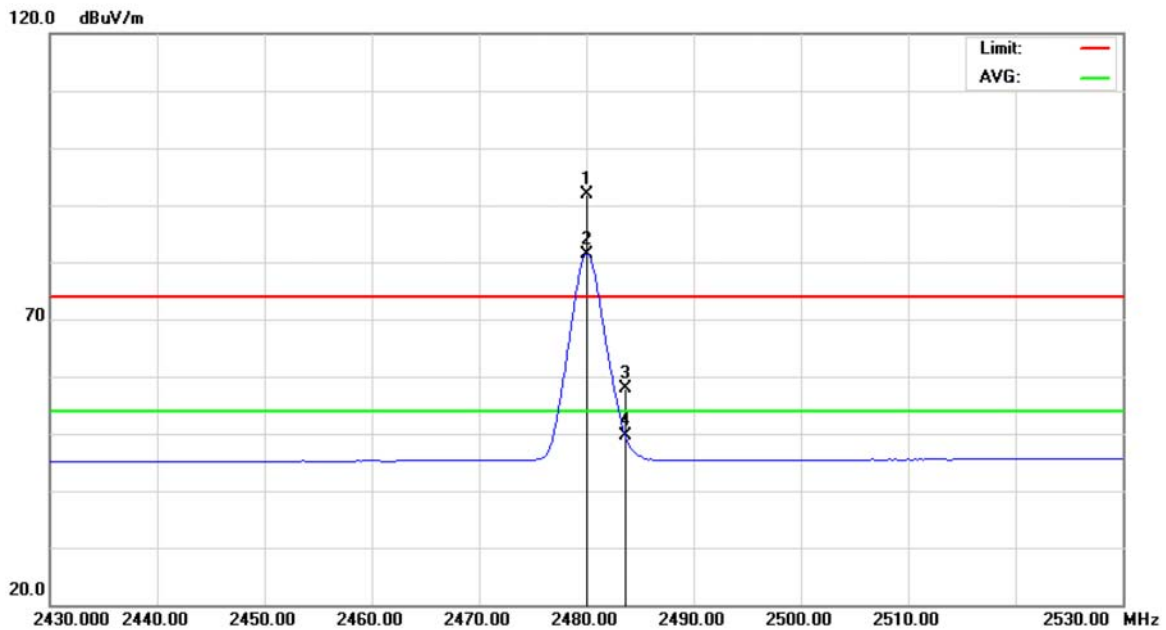


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4960.000	54.44	7.98	62.42	74.00	-11.58	peak	
2	*	4960.000	43.43	7.98	51.41	54.00	-2.59	AVG	
3		7440.590	44.79	15.40	60.19	74.00	-13.81	peak	
4		7440.590	31.10	15.40	46.50	54.00	-7.50	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH78		

Polarization: Horizontal

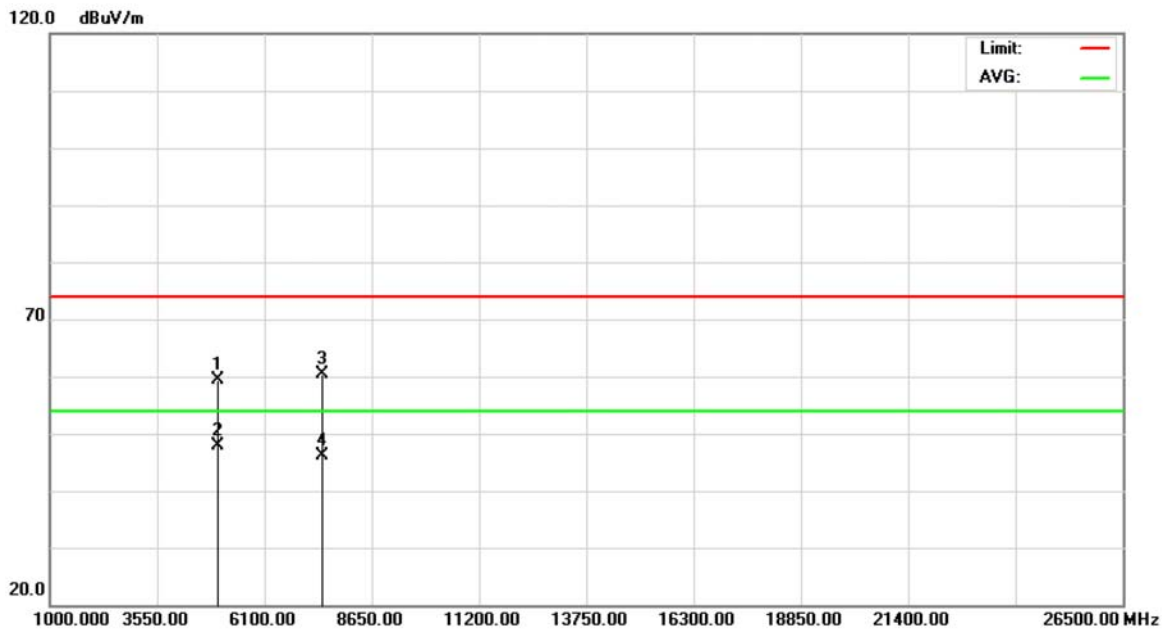


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	57.93	33.90	91.83	74.00	17.83	peak	
2	*	2480.000	47.52	33.90	81.42	54.00	27.42	AVG	
3		2483.500	23.92	33.92	57.84	74.00	-16.16	peak	
4		2483.500	15.79	33.92	49.71	54.00	-4.29	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps / CH78		

Polarization: Horizontal

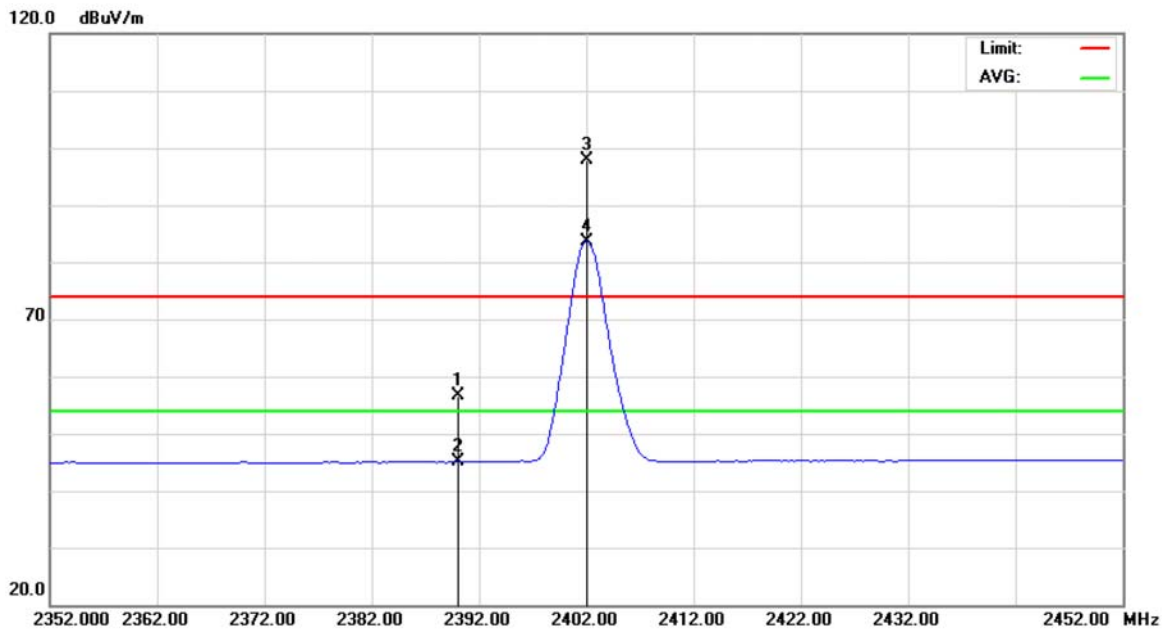


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4960.010	51.38	7.98	59.36	74.00	-14.64	peak	
2	*	4960.010	39.79	7.98	47.77	54.00	-6.23	AVG	
3		7441.400	45.03	15.41	60.44	74.00	-13.56	peak	
4		7441.400	30.77	15.41	46.18	54.00	-7.82	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH00		

Polarization: Vertical

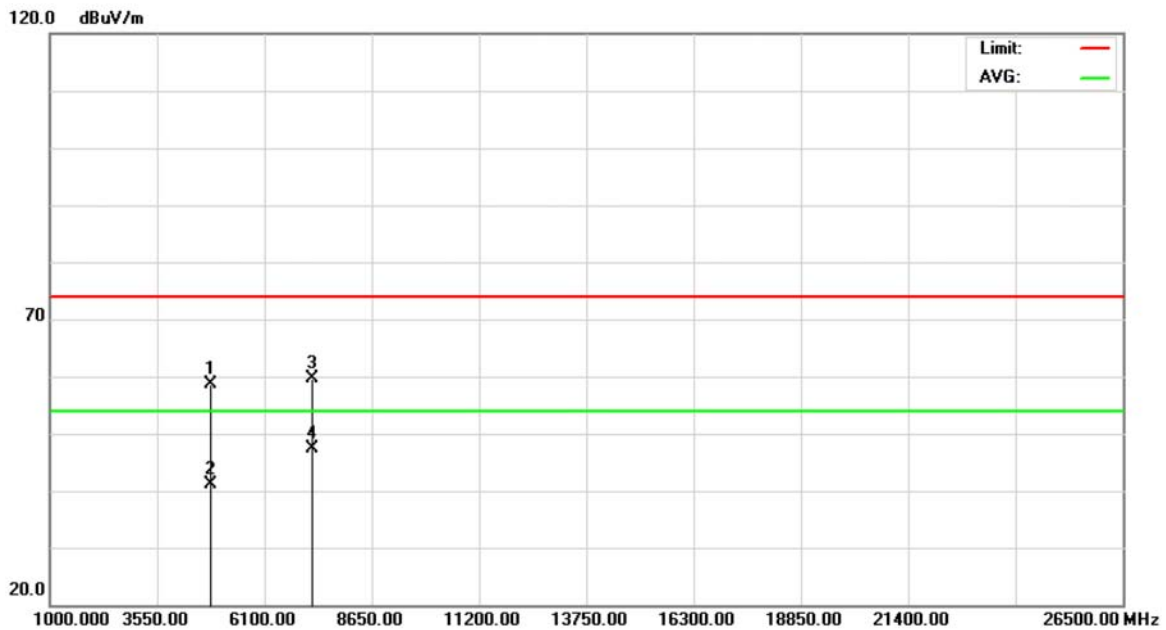


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	23.25	33.42	56.67	74.00	-17.33	peak	
2		2390.000	11.62	33.42	45.04	54.00	-8.96	AVG	
3	X	2402.000	64.30	33.49	97.79	74.00	23.79	peak	
4	*	2402.000	50.15	33.49	83.64	54.00	29.64	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH00		

Polarization: Vertical

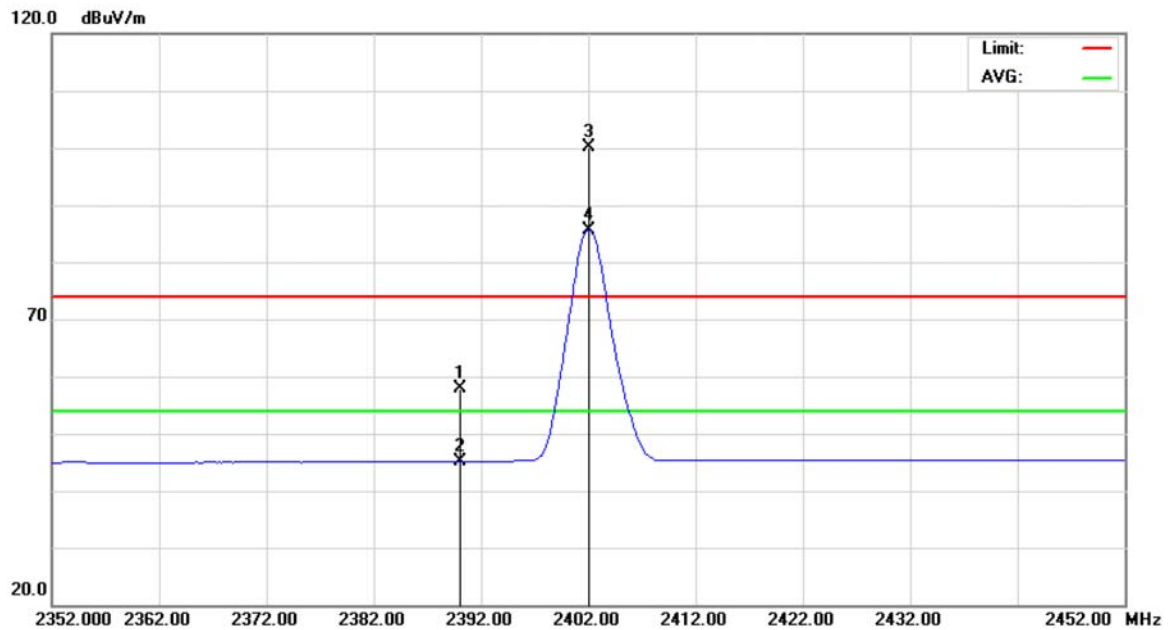


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.020	51.11	7.41	58.52	74.00	-15.48	peak	
2		4804.020	33.78	7.41	41.19	54.00	-12.81	AVG	
3		7206.530	44.90	14.79	59.69	74.00	-14.31	peak	
4	*	7206.530	32.66	14.79	47.45	54.00	-6.55	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH00		

Polarization: Horizontal

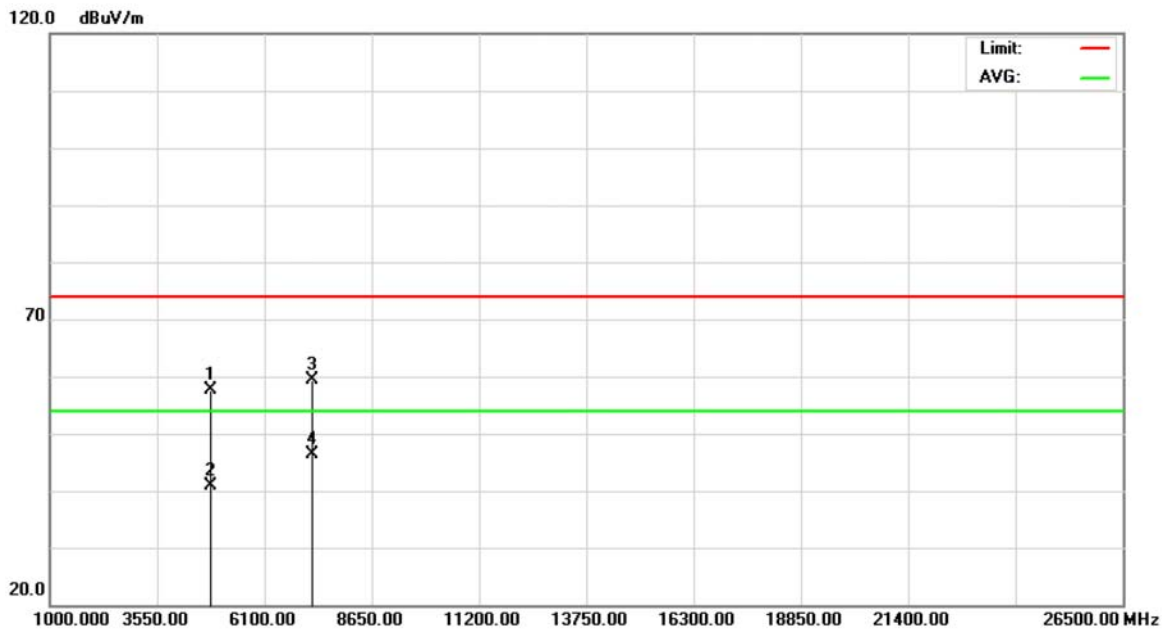


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	24.41	33.42	57.83	74.00	-16.17	peak	
2		2390.000	11.67	33.42	45.09	54.00	-8.91	AVG	
3	X	2402.000	66.58	33.49	100.07	74.00	26.07	peak	
4	*	2402.000	52.26	33.49	85.75	54.00	31.75	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH00		

Polarization: Horizontal

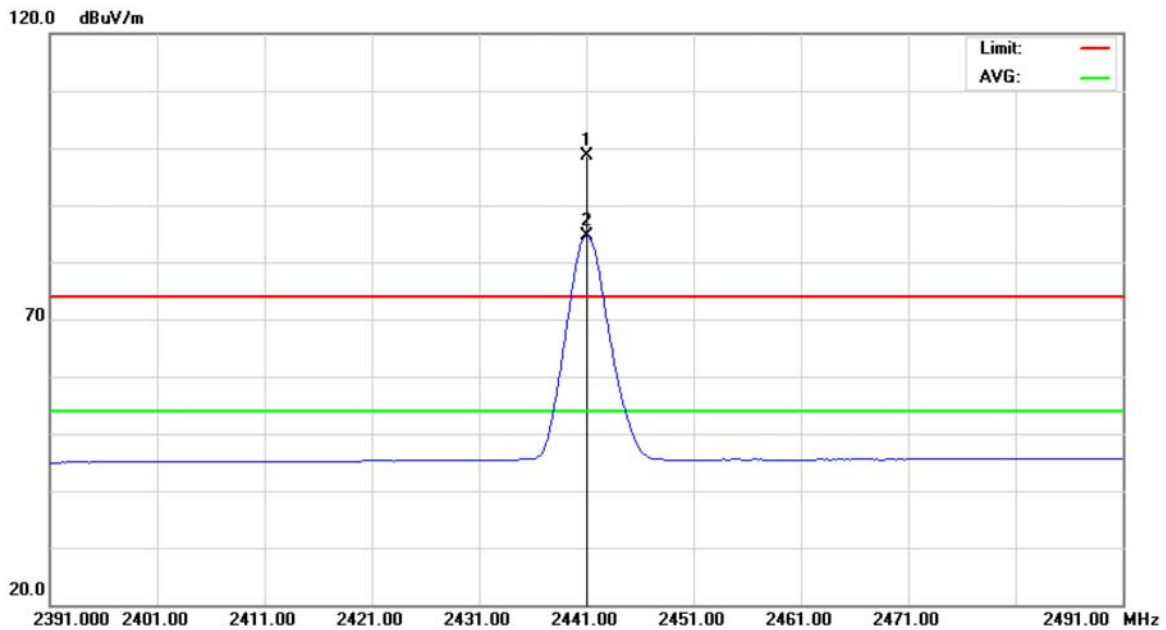


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.010	50.29	7.41	57.70	74.00	-16.30	peak	
2		4804.010	33.42	7.41	40.83	54.00	-13.17	AVG	
3		7205.820	44.67	14.79	59.46	74.00	-14.54	peak	
4	*	7205.820	31.55	14.79	46.34	54.00	-7.66	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH39		

Polarization: Vertical

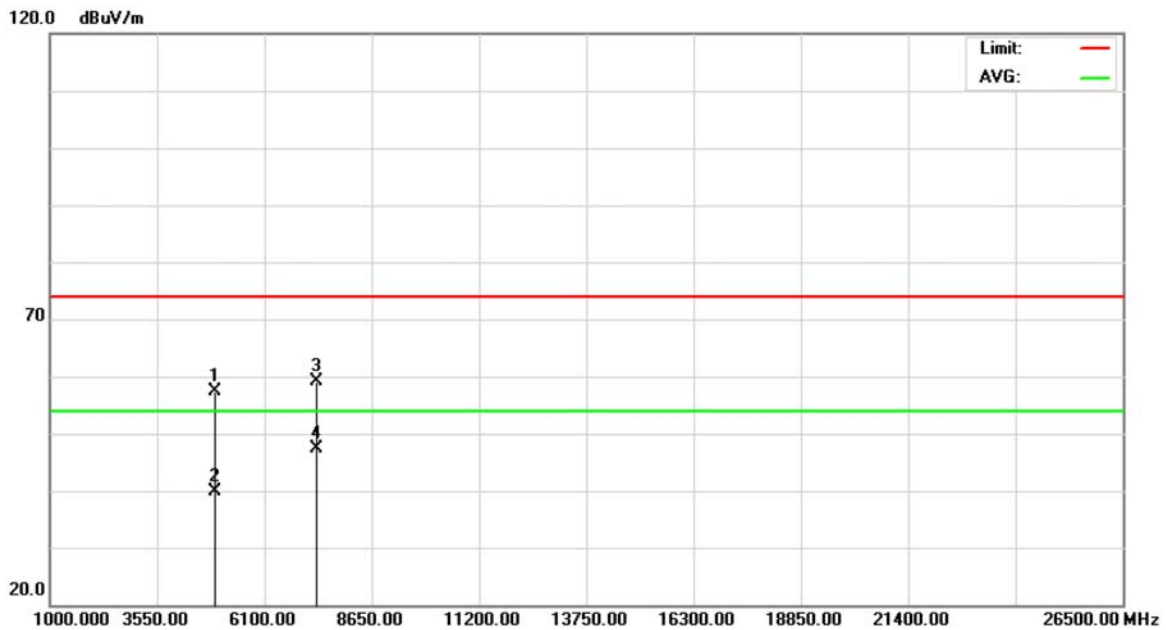


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2441.000	64.88	33.69	98.57	74.00	24.57	peak	
2	*	2441.000	50.94	33.69	84.63	54.00	30.63	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH39		

Polarization: Vertical

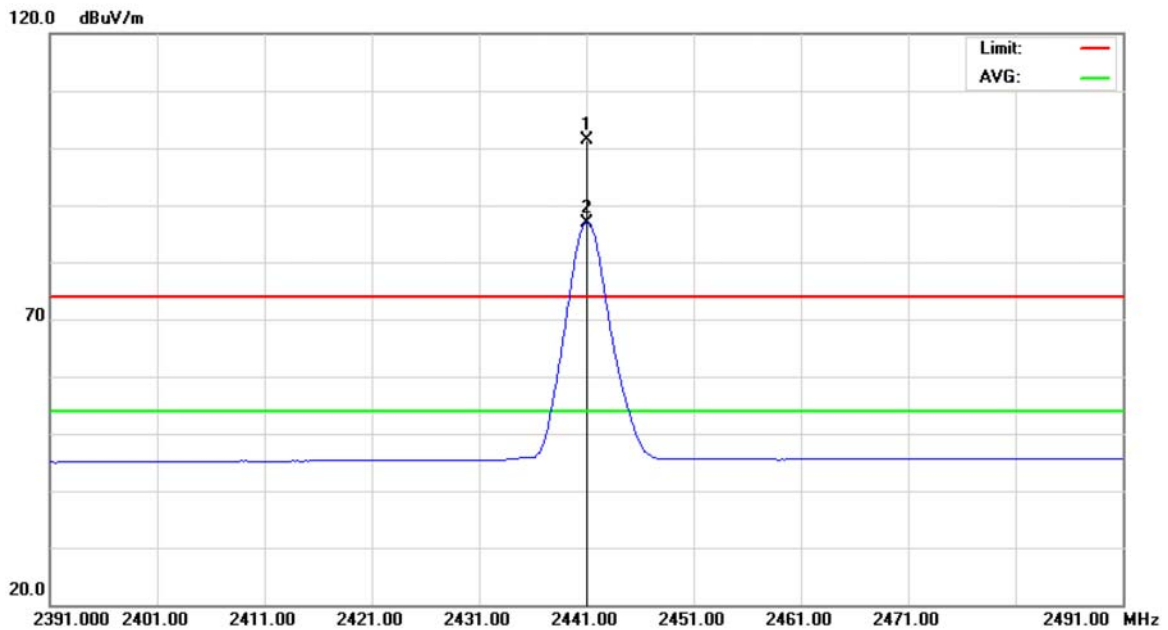


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4881.990	49.68	7.70	57.38	74.00	-16.62	peak	
2		4881.990	32.27	7.70	39.97	54.00	-14.03	AVG	
3		7322.500	44.13	15.09	59.22	74.00	-14.78	peak	
4	*	7322.500	32.36	15.09	47.45	54.00	-6.55	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH39		

Polarization: Horizontal

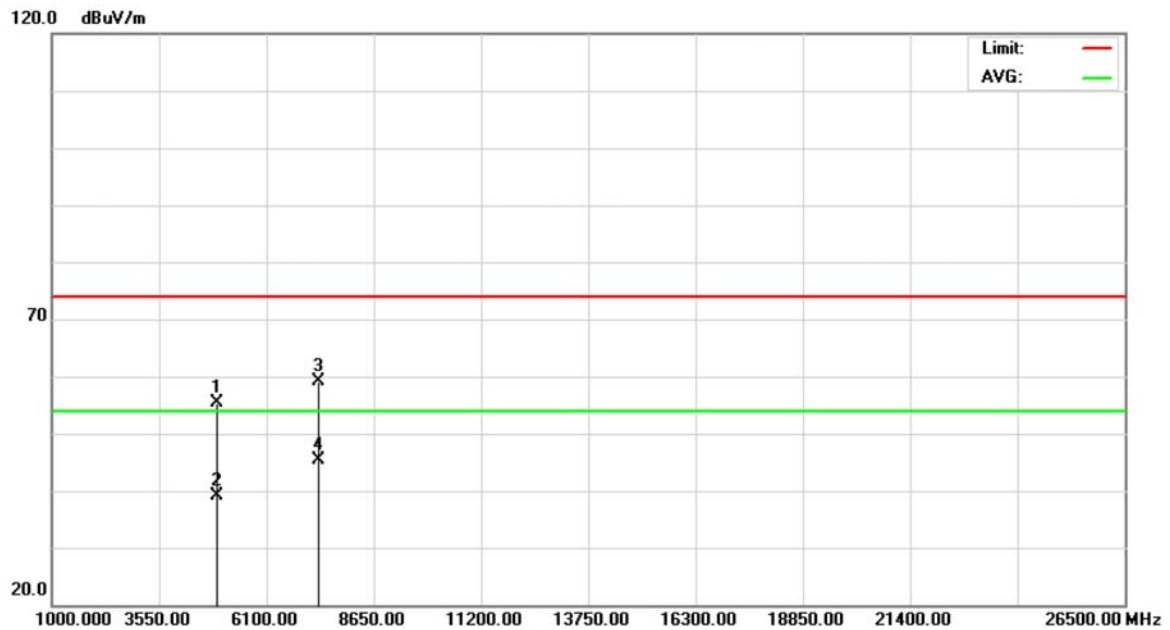


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2441.000	67.75	33.69	101.44	74.00	27.44	peak	
2	*	2441.000	53.23	33.69	86.92	54.00	32.92	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH39		

Polarization: Horizontal

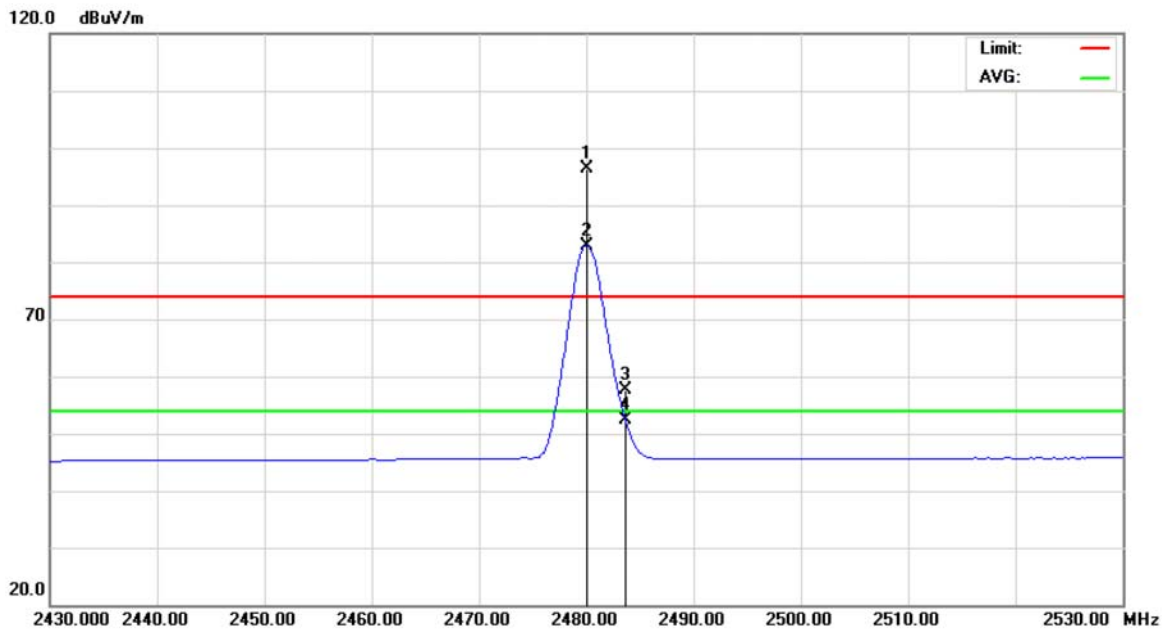


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4881.940	47.67	7.69	55.36	74.00	-18.64	peak	
2		4881.940	31.40	7.69	39.09	54.00	-14.91	AVG	
3		7322.470	44.08	15.09	59.17	74.00	-14.83	peak	
4	*	7322.470	30.36	15.09	45.45	54.00	-8.55	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH78		

Polarization: Vertical

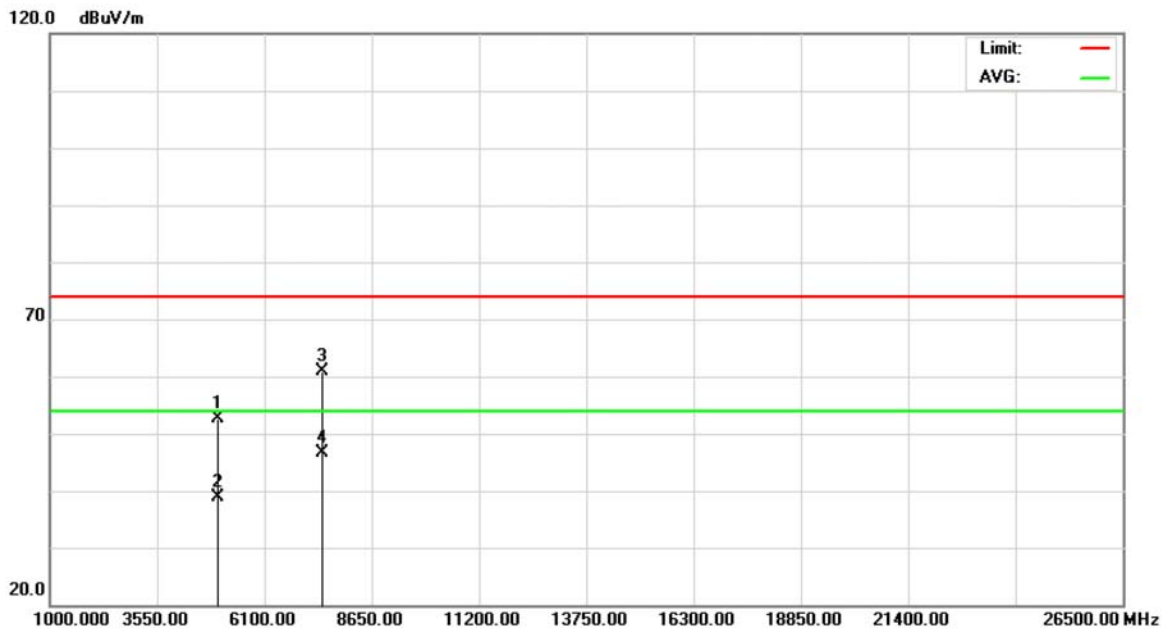


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	62.51	33.90	96.41	74.00	22.41	peak	
2	*	2480.000	49.07	33.90	82.97	54.00	28.97	AVG	
3		2483.500	23.71	33.92	57.63	74.00	-16.37	peak	
4		2483.500	18.55	33.92	52.47	54.00	-1.53	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH78		

Polarization: Vertical

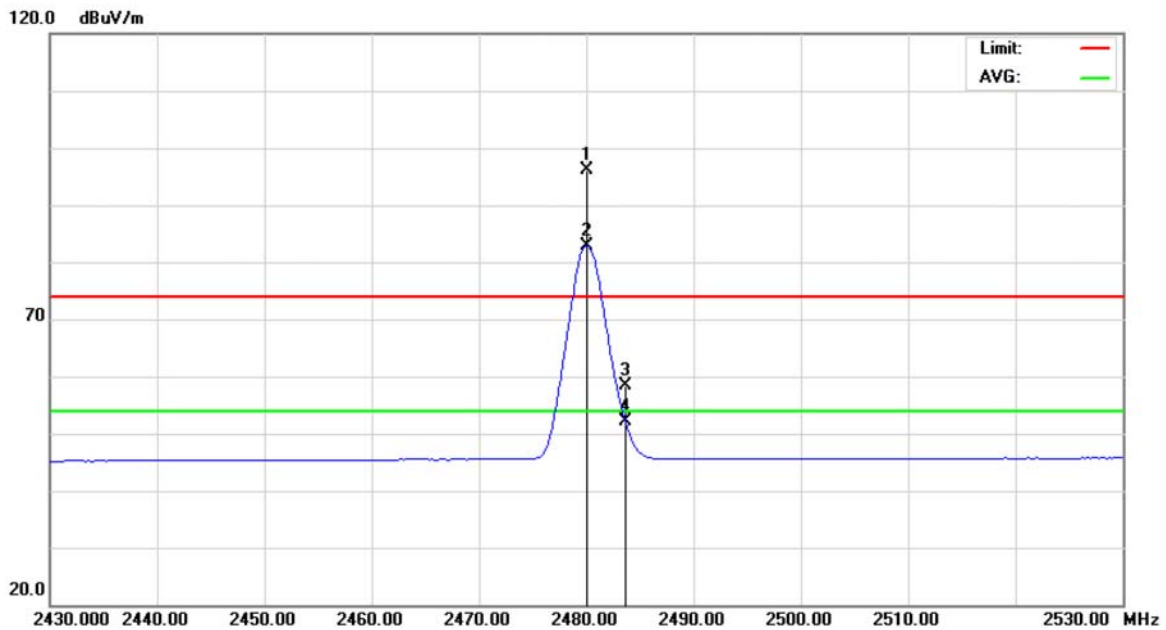


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4959.410	44.78	7.97	52.75	74.00	-21.25	peak	
2		4959.410	30.92	7.97	38.89	54.00	-15.11	AVG	
3		7437.800	45.53	15.40	60.93	74.00	-13.07	peak	
4	*	7437.800	31.29	15.40	46.69	54.00	-7.31	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH78		

Polarization: Horizontal

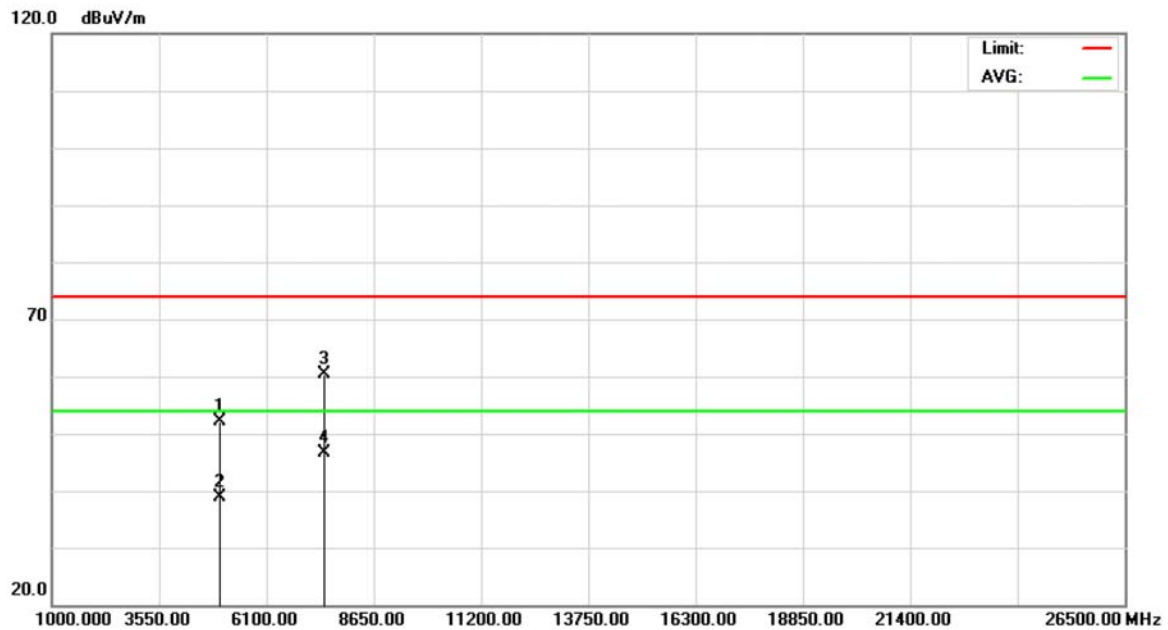


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	62.22	33.90	96.12	74.00	22.12	peak	
2	*	2480.000	48.97	33.90	82.87	54.00	28.87	AVG	
3		2483.500	24.48	33.92	58.40	74.00	-15.60	peak	
4		2483.500	18.31	33.92	52.23	54.00	-1.77	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps / CH78		

Polarization: Horizontal



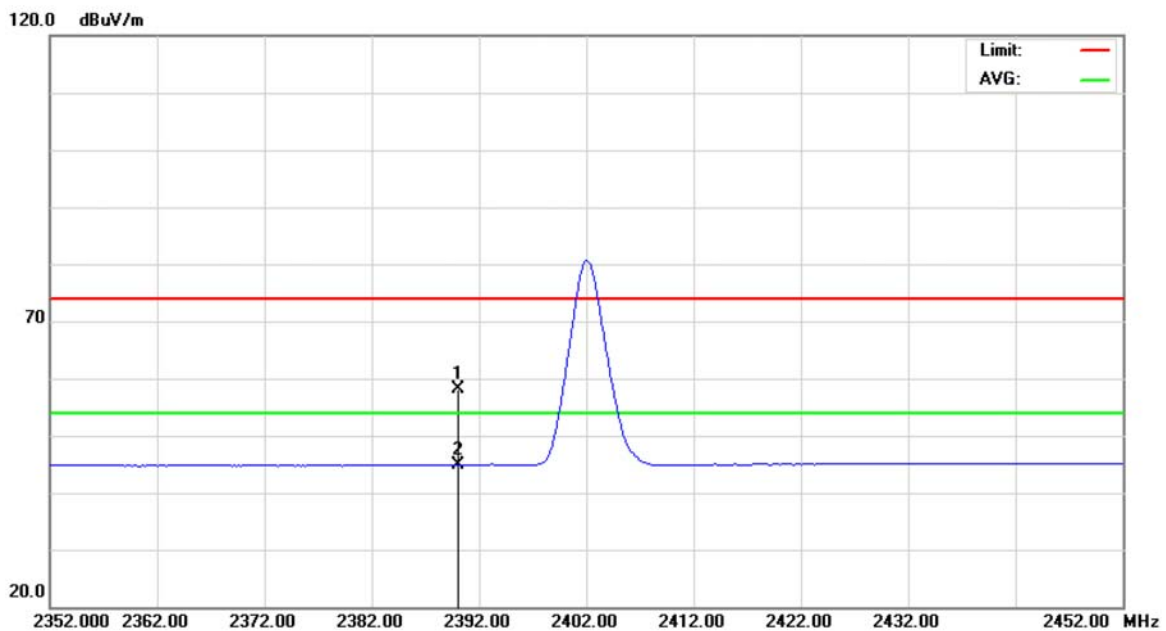
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4960.370	44.25	7.98	52.23	74.00	-21.77	peak	
2		4960.370	30.78	7.98	38.76	54.00	-15.24	AVG	
3		7439.970	45.09	15.40	60.49	74.00	-13.51	peak	
4	*	7439.970	31.26	15.40	46.66	54.00	-7.34	AVG	



4.1.9 TEST RESULTS-RESTRICTED BANDS REQUIREMENTS

EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps		
Note :	The transmitter was setup to transmit at the lowest channel and the field strength was measured at 2310-2390 MHz.		

Polarization: Vertical

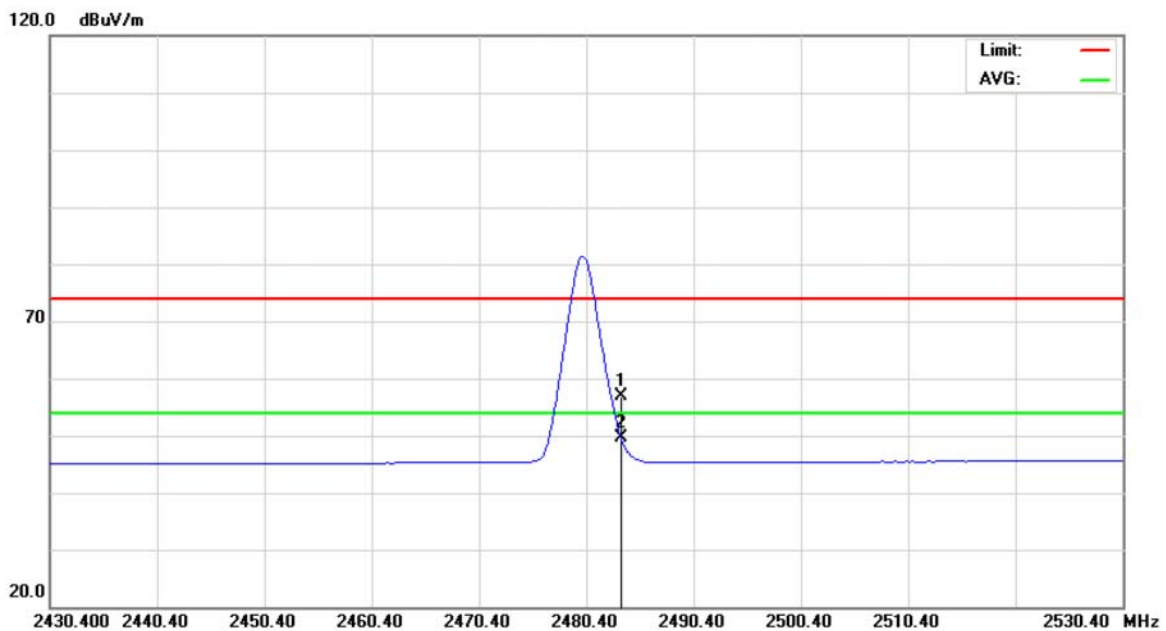


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	24.63	33.42	58.05	74.00	-15.95	peak	
2	*	2390.000	11.38	33.42	44.80	54.00	-9.20	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps		
Note :	The transmitter was setup to transmit at the highest channel and the field strength was measured at 2483.5-2500 MHz.		

Polarization: Vertical

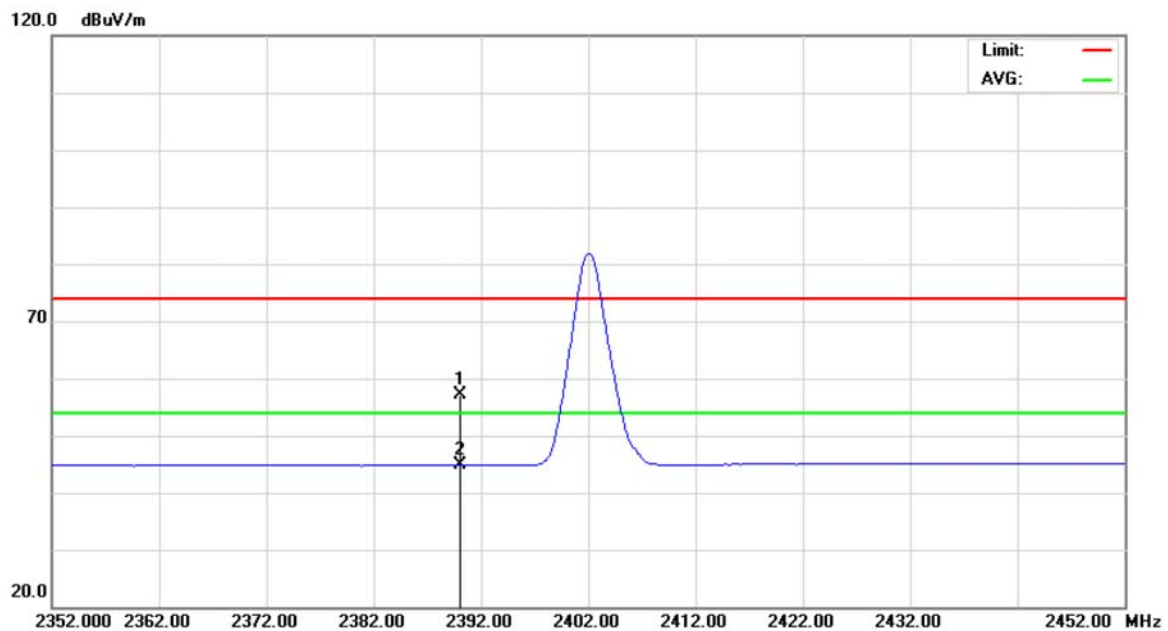


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2483.500	22.89	33.92	56.81	74.00	-17.19	peak	
2	*	2483.500	15.70	33.92	49.62	54.00	-4.38	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps		
Note :	The transmitter was setup to transmit at the lowest channel and the field strength was measured at 2310-2390 MHz.		

Polarization: Horizontal

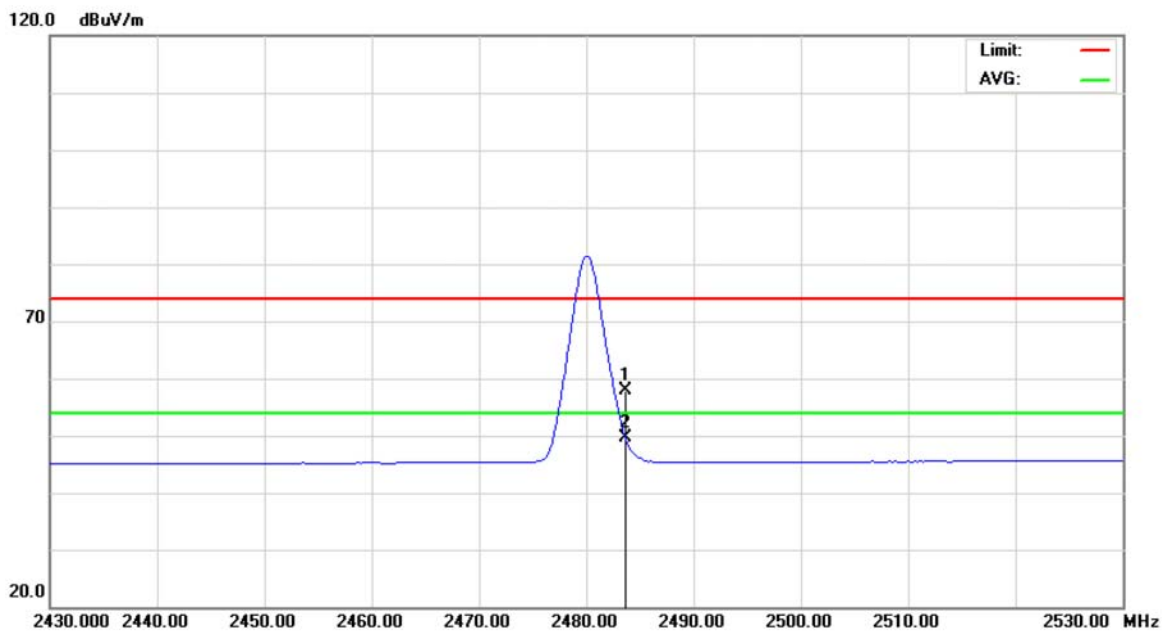


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	23.83	33.42	57.25	74.00	-16.75	peak	
2	*	2390.000	11.37	33.42	44.79	54.00	-9.21	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 1 Mbps		
Note :	The transmitter was setup to transmit at the highest channel and the field strength was measured at 2483.5-2500 MHz.		

Polarization: Horizontal

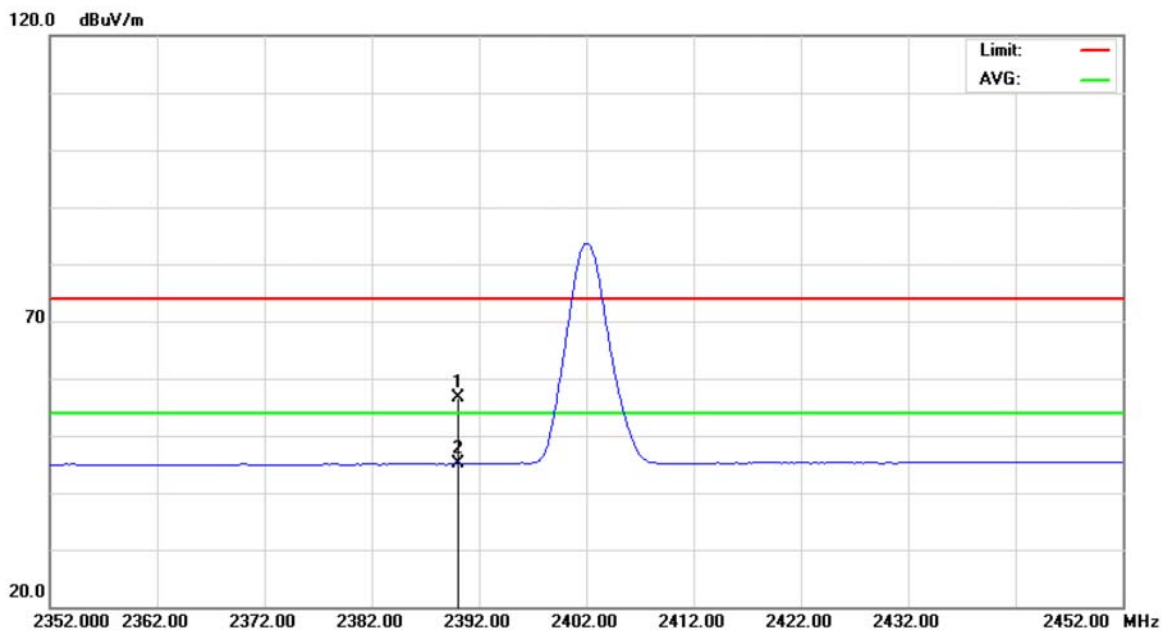


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2483.500	23.92	33.92	57.84	74.00	-16.16	peak	
2	*	2483.500	15.79	33.92	49.71	54.00	-4.29	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps		
Note :	The transmitter was setup to transmit at the lowest channel and the field strength was measured at 2310-2390 MHz.		

Polarization: Vertical

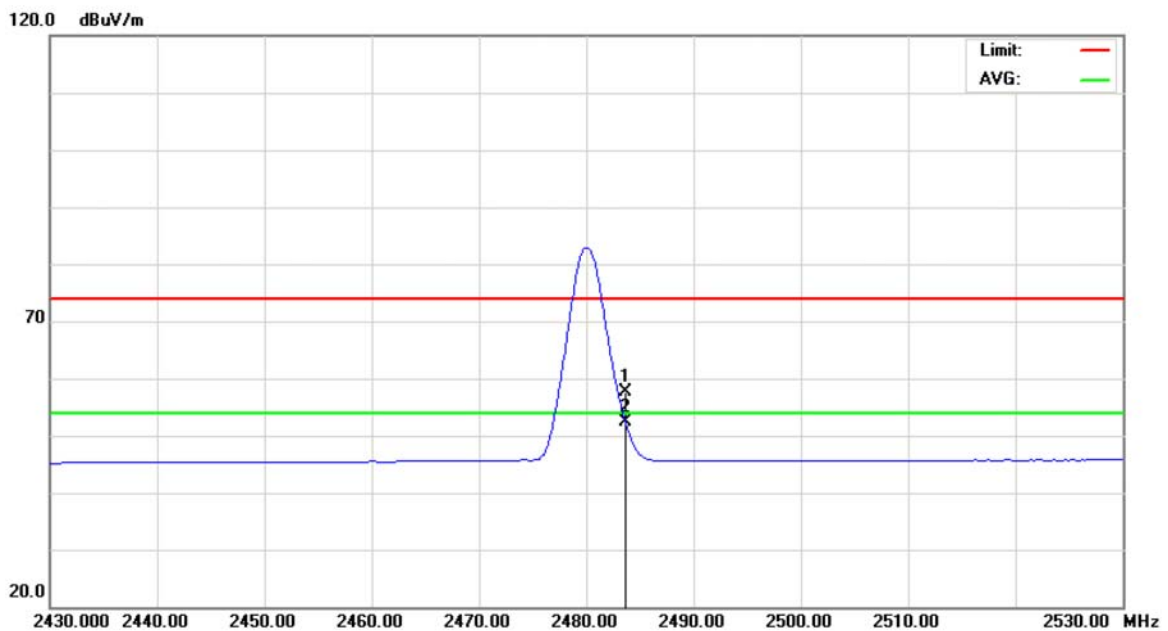


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	23.25	33.42	56.67	74.00	-17.33	peak	
2	*	2390.000	11.62	33.42	45.04	54.00	-8.96	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps		
Note :	The transmitter was setup to transmit at the highest channel and the field strength was measured at 2483.5-2500 MHz.		

Polarization: Vertical

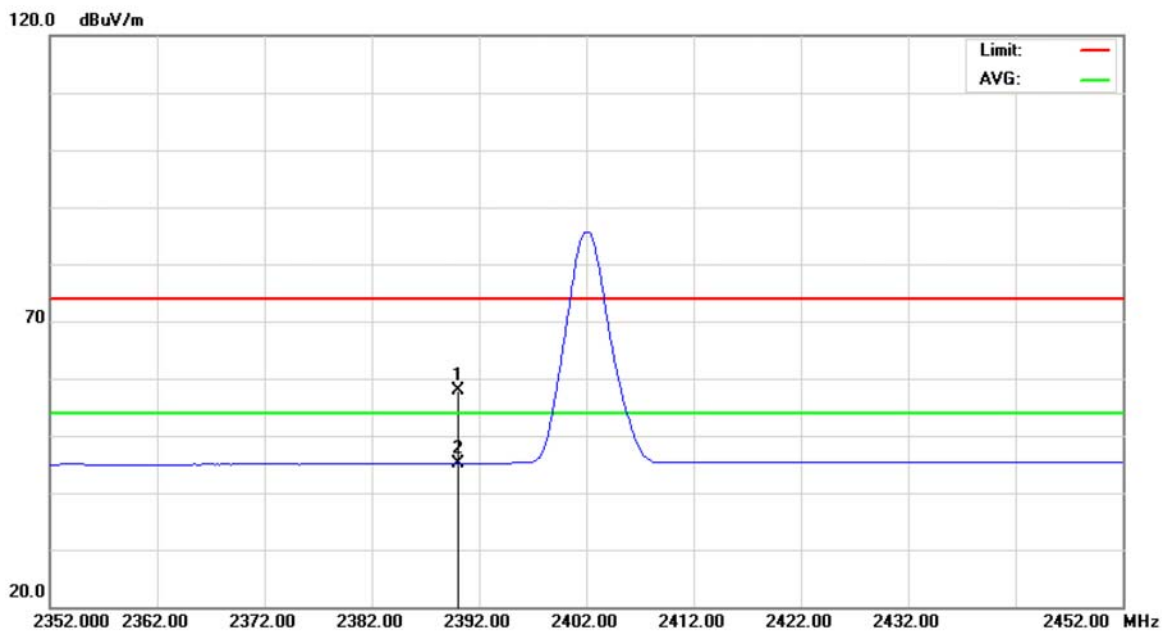


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2483.500	23.71	33.92	57.63	74.00	-16.37	peak	
2	*	2483.500	18.55	33.92	52.47	54.00	-1.53	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps		
Note :	The transmitter was setup to transmit at the lowest channel and the field strength was measured at 2310-2390 MHz.		

Polarization: Horizontal

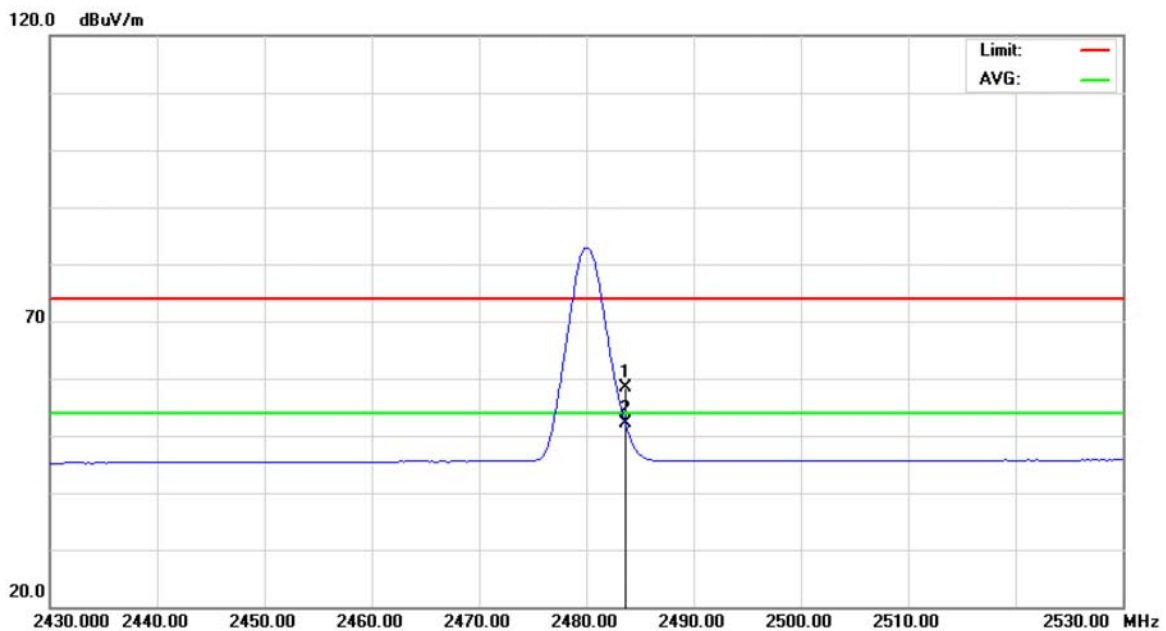


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	24.41	33.42	57.83	74.00	-16.17	peak	
2	*	2390.000	11.67	33.42	45.09	54.00	-8.91	AVG	



EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)	Orthogonal Axes:	X
Test Mode :	Bluetooth / 3 Mbps		
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	24.48	33.92	58.40	74.00	-15.60	peak	
2	*	2483.500	18.31	33.92	52.23	54.00	-1.77	AVG	

**5. NUMBER OF HOPPING CHANNEL****5.1 APPLIED PROCEDURES / LIMIT**

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.247 (a)(1)(ii)	Number of Hopping Channel	2400-2483.5	PASS

5.2 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 06, 2012

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

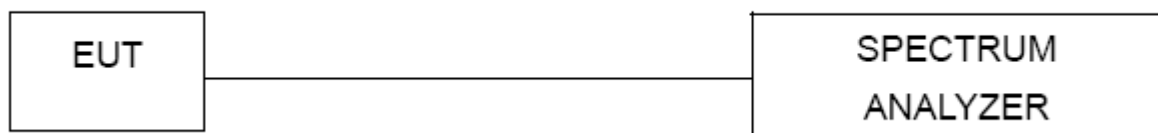
Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3 TEST PROCEDURE

- 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.

5.4 DEVIATION FROM STANDARD

No deviation.

5.5 TEST SETUP**5.6 EUT OPERATION CONDITIONS**

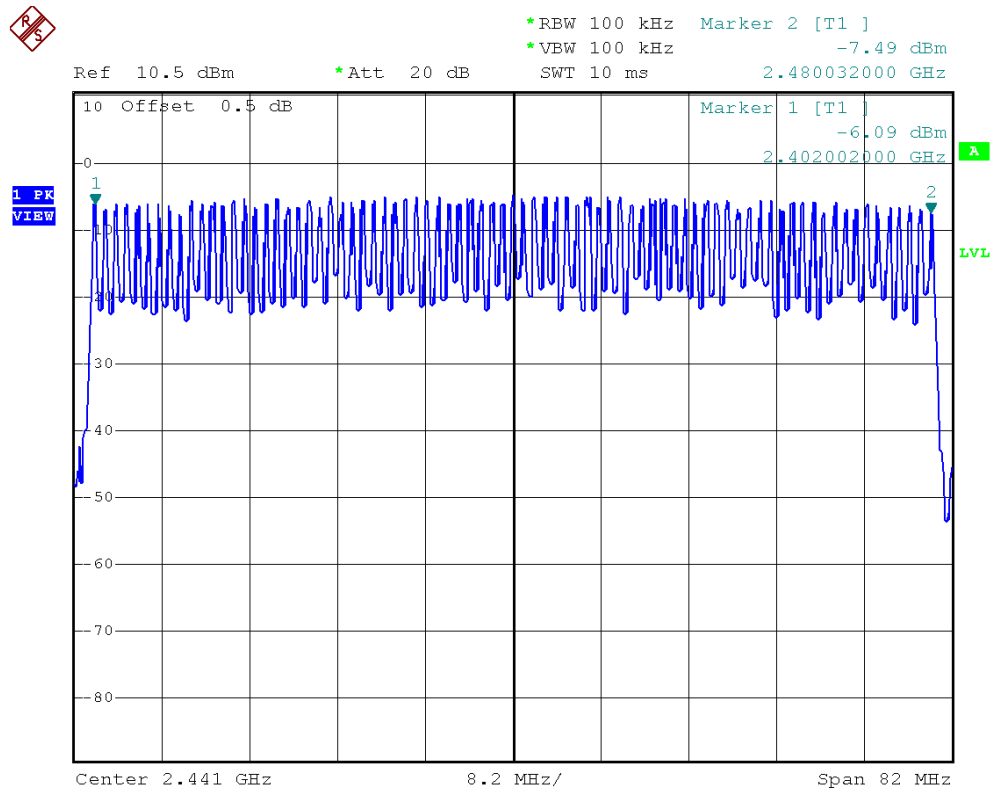
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.



5.7 TEST RESULTS

EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 1 Mbps		

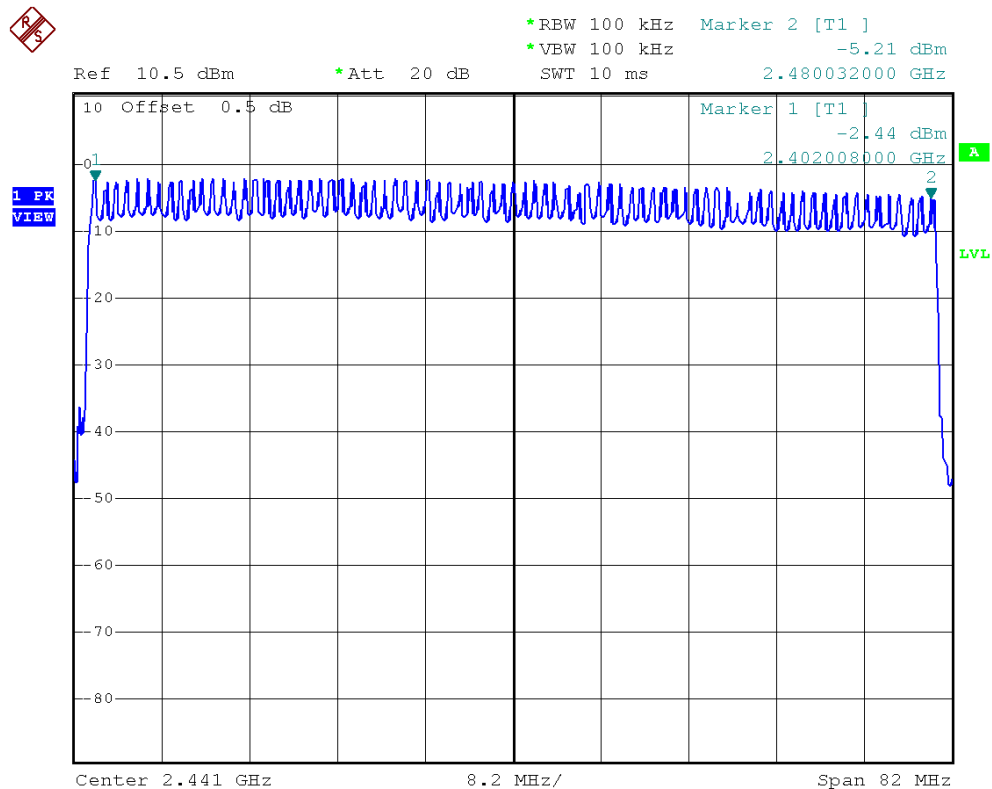
Number of Hopping Channel	79
---------------------------	----





EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 3 Mbps		

Number of Hopping Channel	79
---------------------------	----



**6. AVERAGE TIME OF OCCUPANCY****6.1 APPLIED PROCEDURES / LIMIT**

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(ii)	Average Time of Occupancy	≤ 0.4 sec (a 30 second period)	2400-2483.5	PASS

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. 06, 2012

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

6.3 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyser
- Set RBW of spectrum analyzer to 100kHz and VBW to 100kHz.
- 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.

6.4 DEVIATION FROM STANDARD

No deviation.



6.5 TEST SETUP



6.6 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

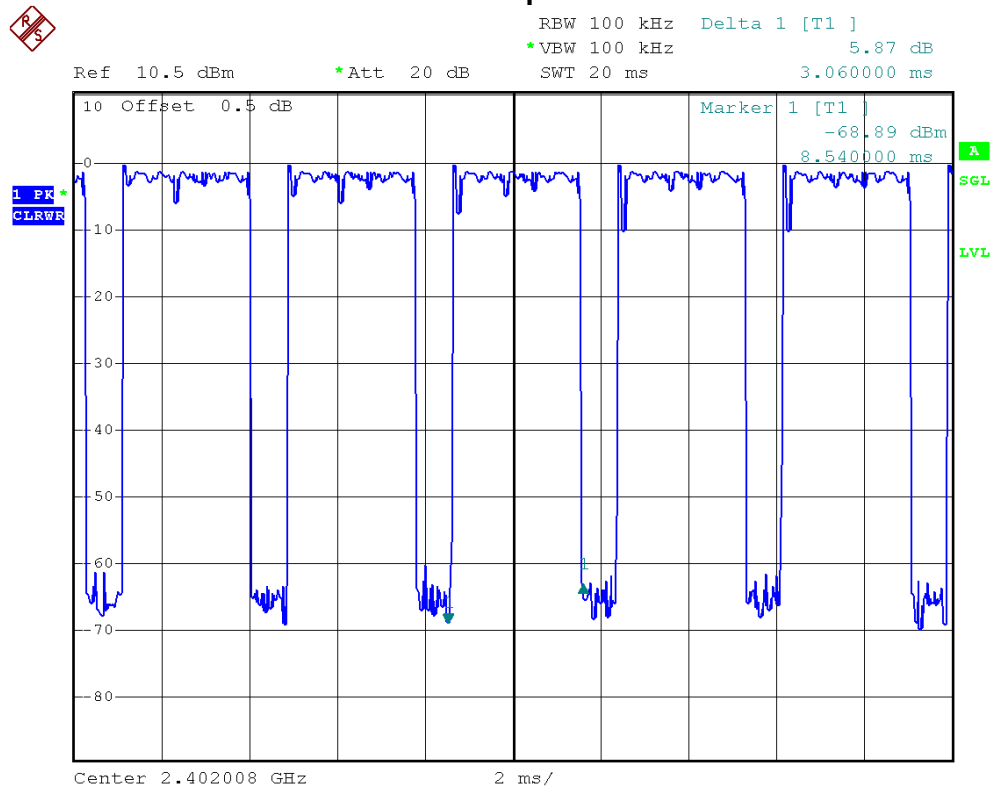


6.7 TEST RESULTS

EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 1 Mbps / CH00-DH5/DH3/DH1		

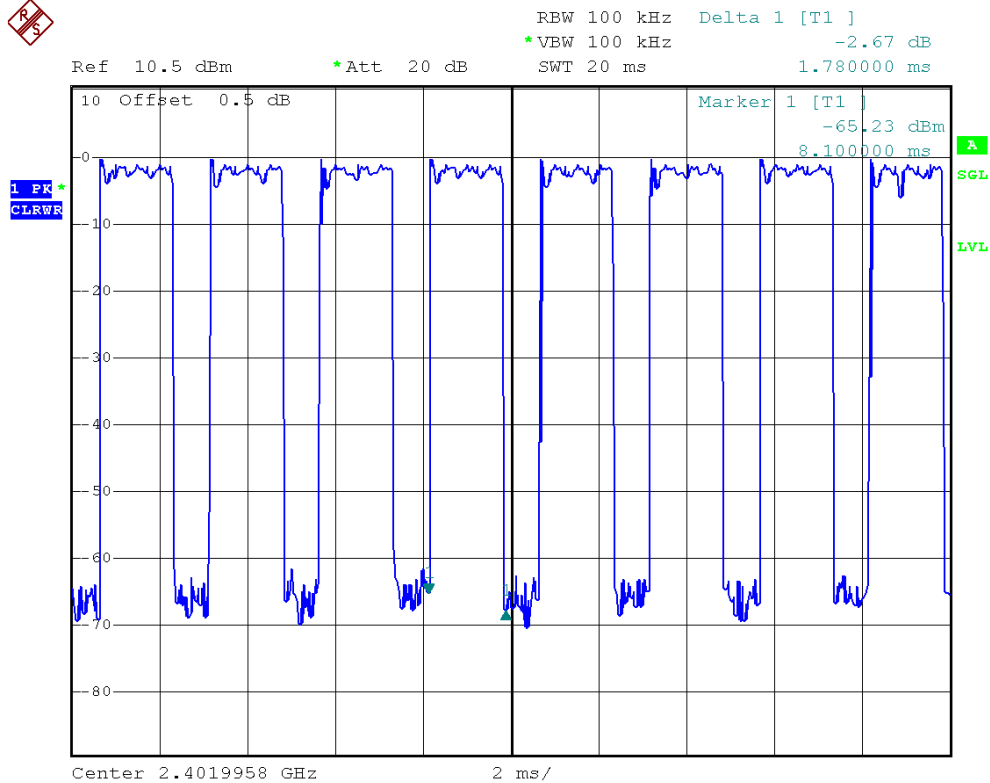
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2402 MHz	3.0600	0.3264	0.4000
DH3	2402 MHz	1.7800	0.2848	0.4000
DH1	2402 MHz	0.5400	0.1728	0.4000

Bluetooth / 1 Mbps / CH00-DH5

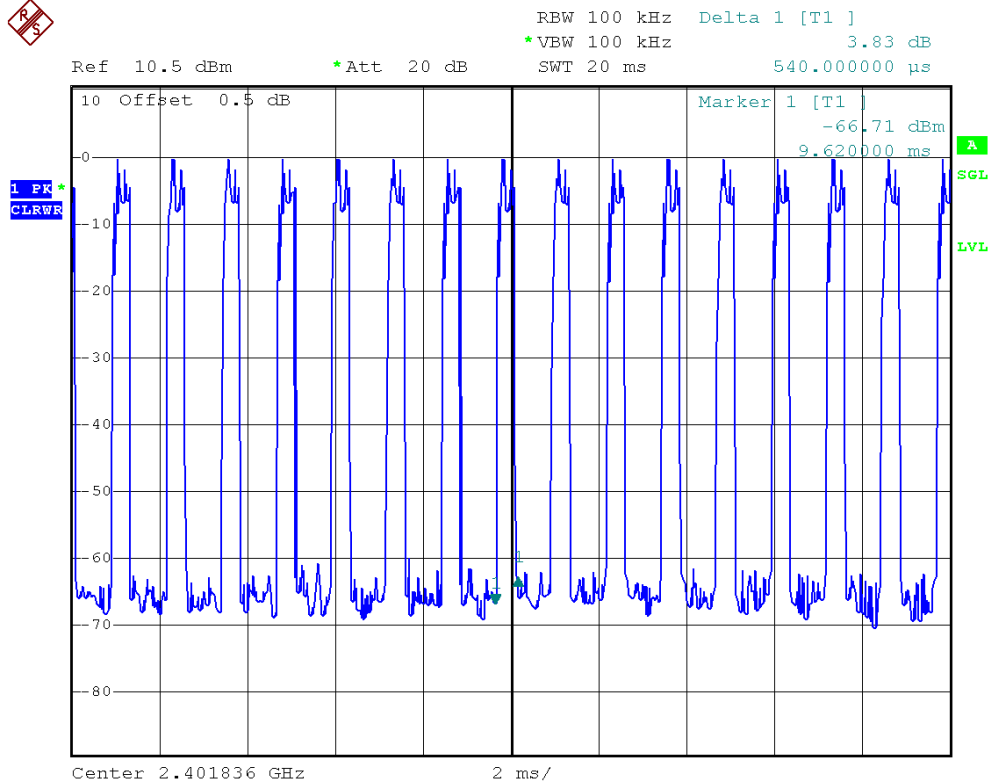




Bluetooth / 1 Mbps / CH00-DH3



Bluetooth / 1 Mbps / CH00-DH1

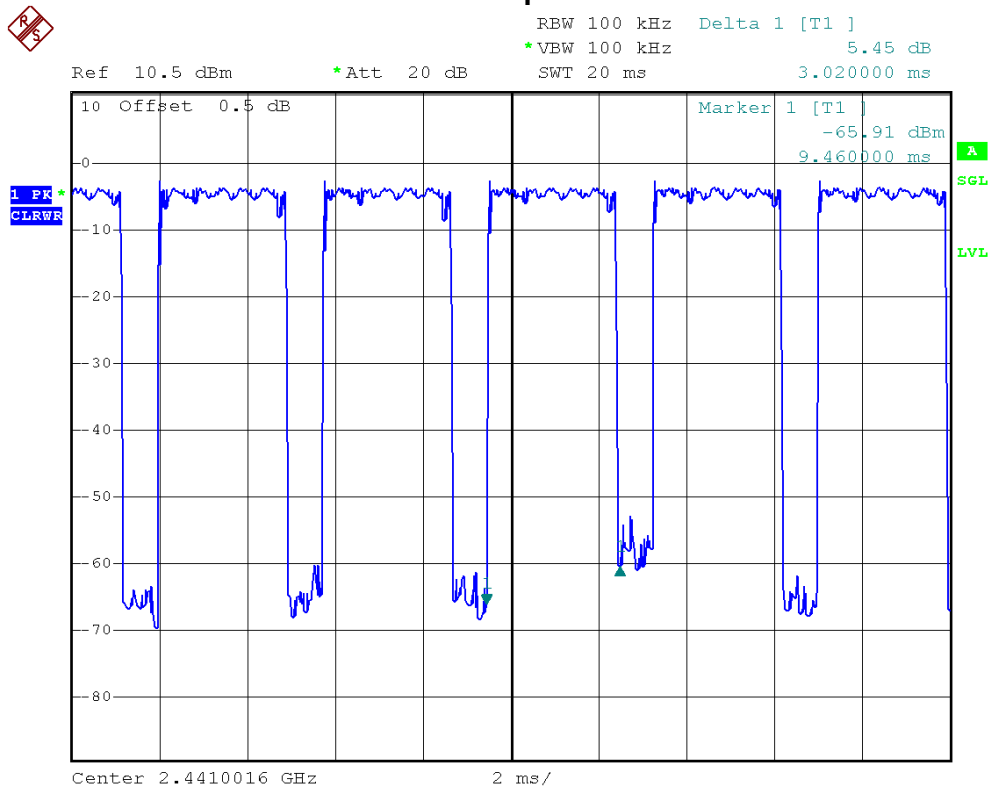




EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 1 Mbps / CH39-DH5/DH3/DH1		

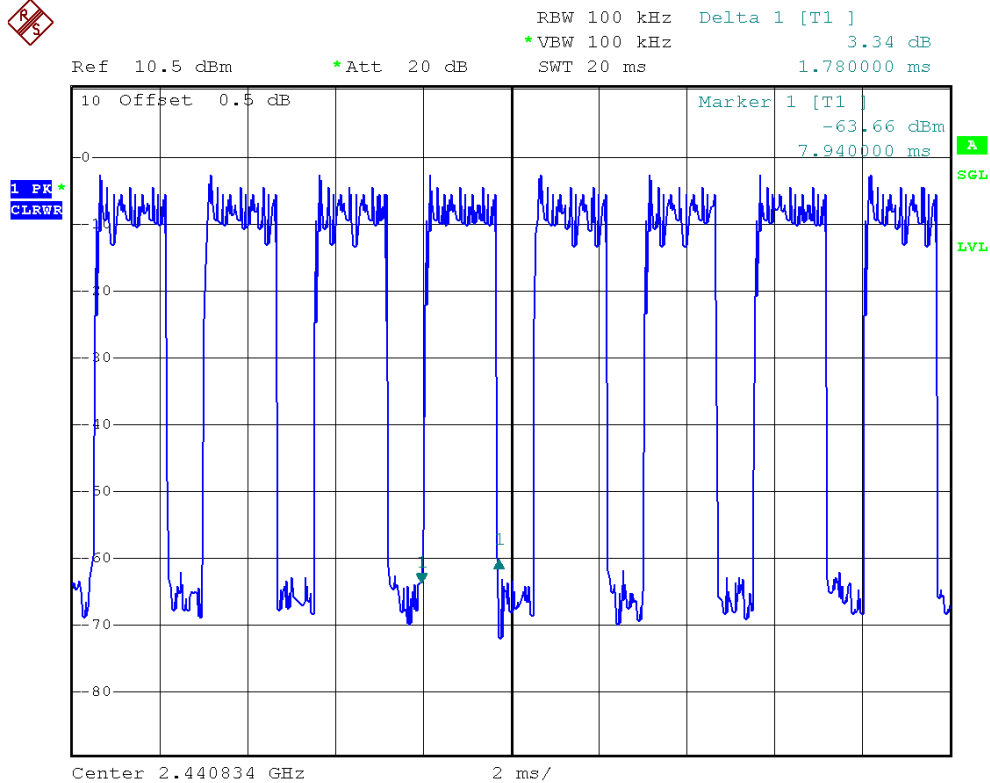
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2441 MHz	3.0200	0.3221	0.4000
DH3	2441 MHz	1.7800	0.2848	0.4000
DH1	2441 MHz	0.4600	0.1472	0.4000

Bluetooth / 1 Mbps / CH39-DH5

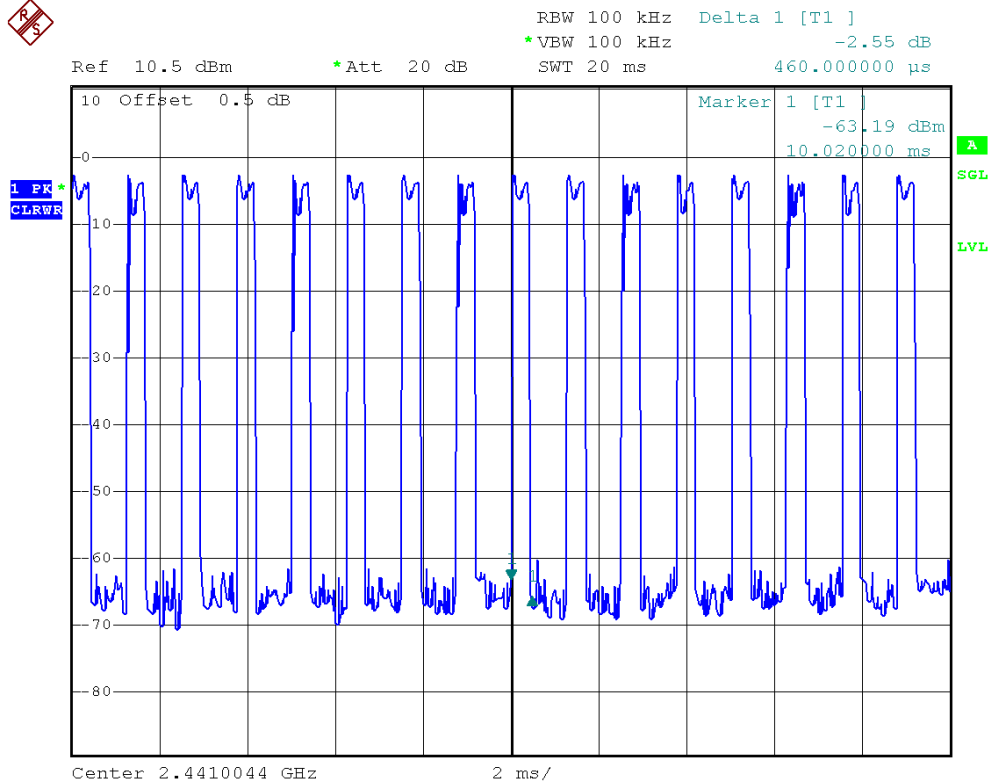




Bluetooth / 1 Mbps / CH39-DH3



Bluetooth / 1 Mbps / CH39-DH1

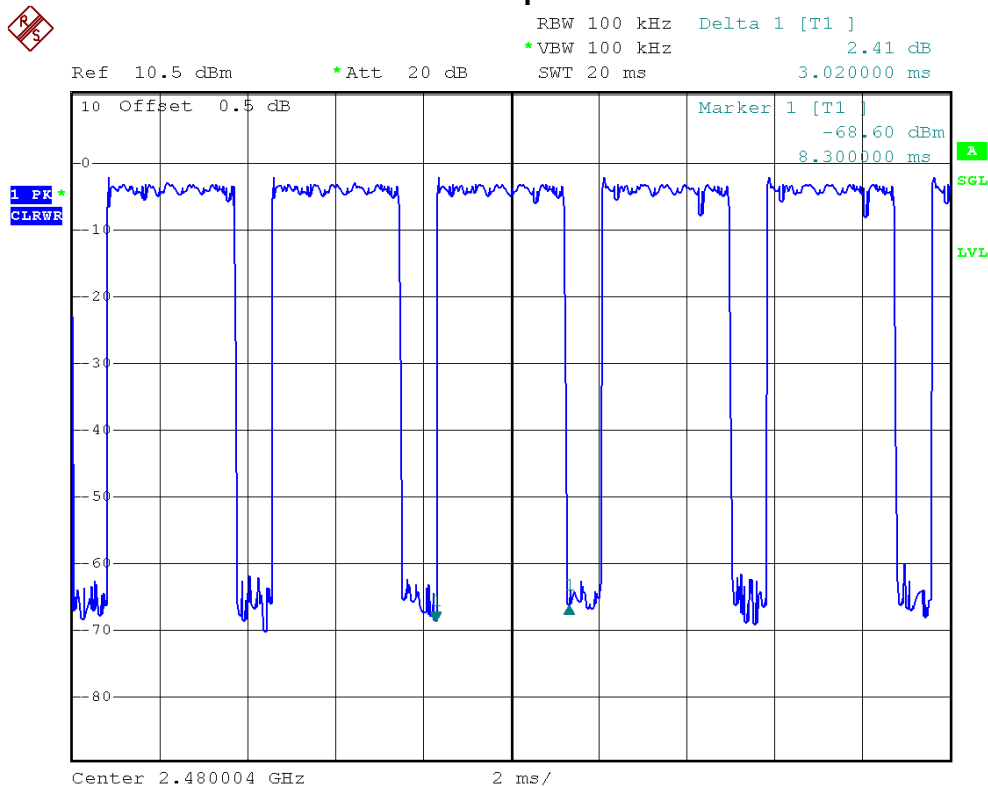




EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 1 Mbps / CH78-DH5/DH3/DH1		

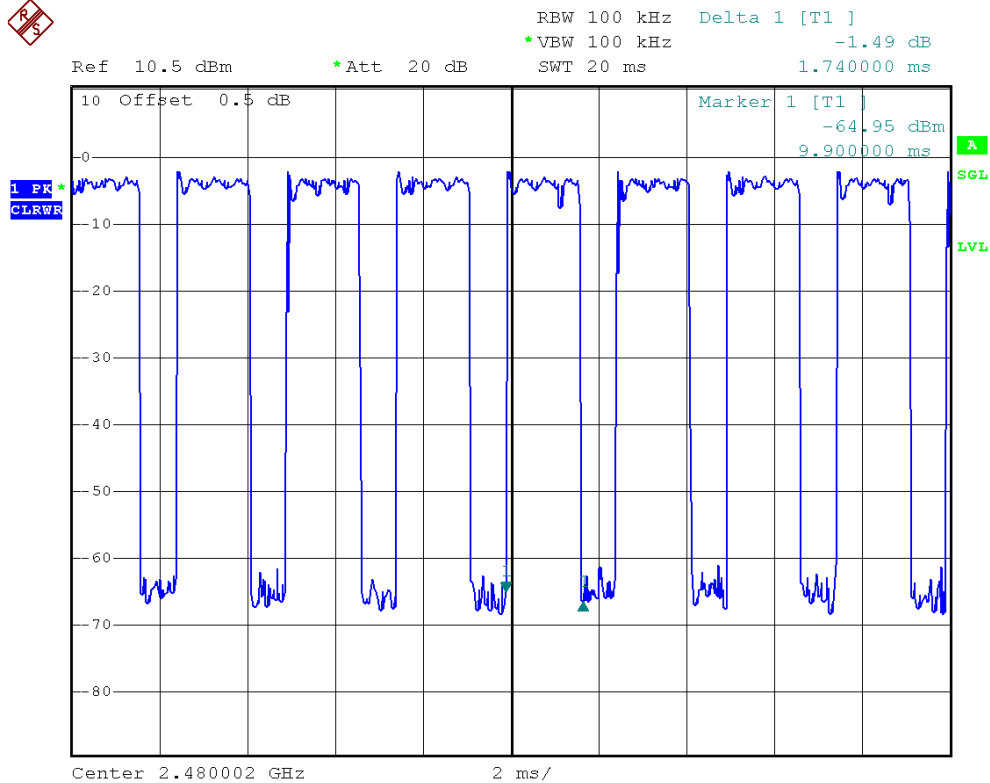
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2480 MHz	3.0200	0.3221	0.4000
DH3	2480 MHz	1.7400	0.2784	0.4000
DH1	2480 MHz	0.5000	0.1600	0.4000

Bluetooth / 1 Mbps / CH78-DH5

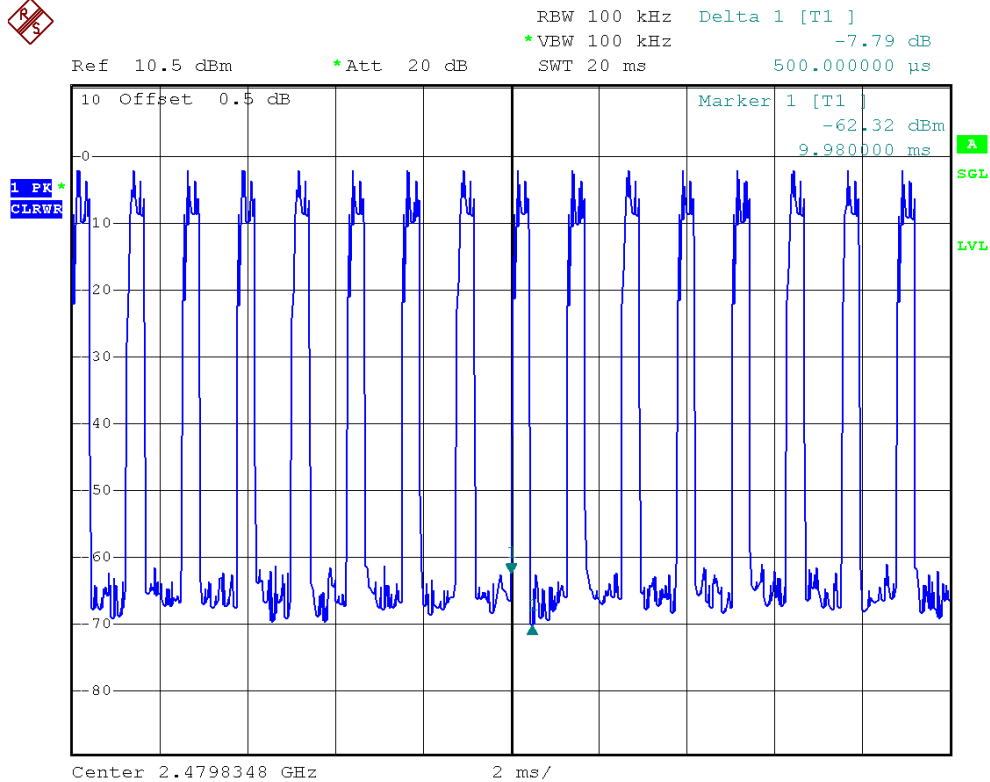




Bluetooth / 1 Mbps / CH78-DH3



Bluetooth / 1 Mbps / CH78-DH1

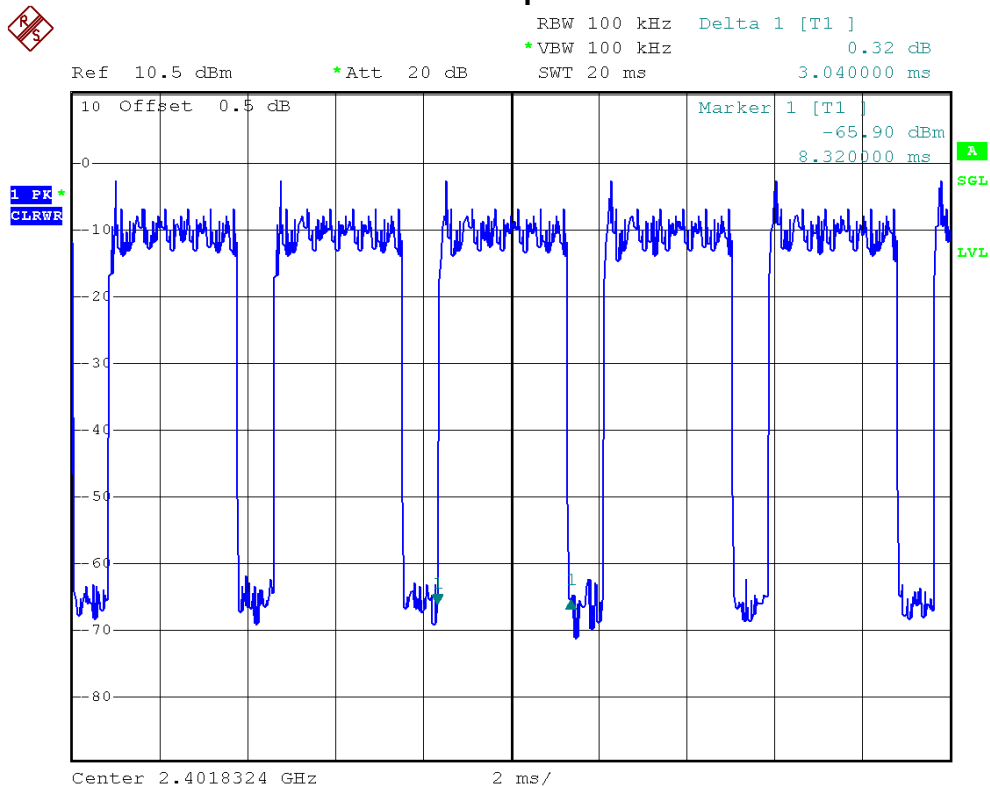




EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 3 Mbps / CH00-DH5/DH3/DH1		

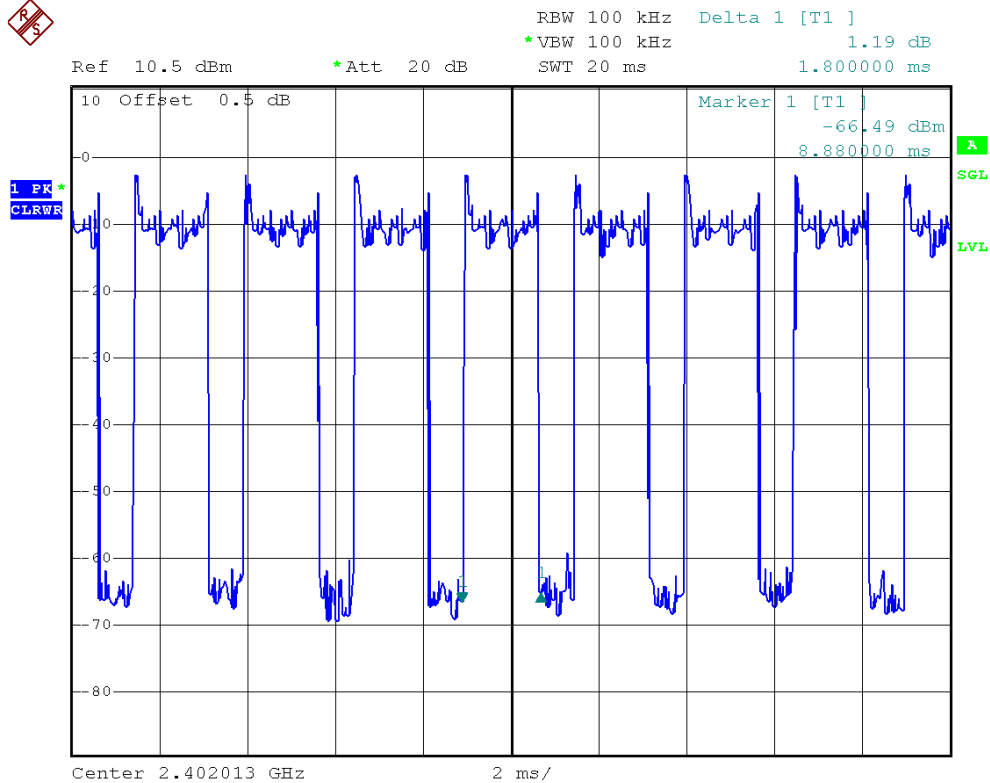
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2402 MHz	3.0400	0.3243	0.4000
DH3	2402 MHz	1.8000	0.2880	0.4000
DH1	2402 MHz	0.5200	0.1664	0.4000

Bluetooth / 3 Mbps / CH00-DH5

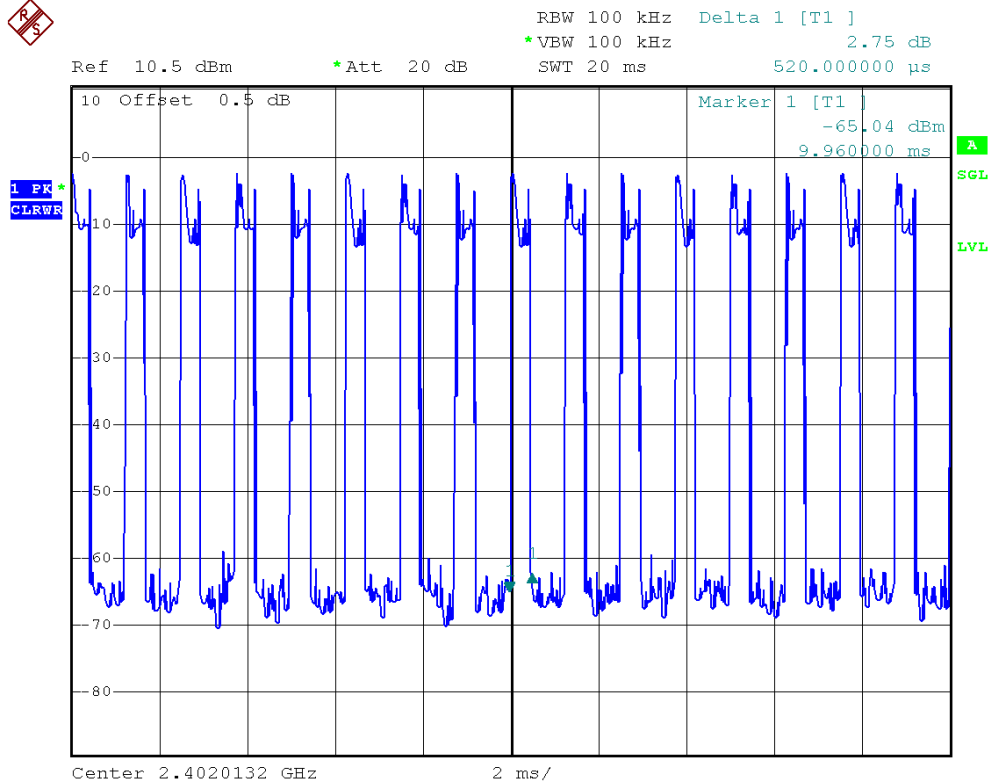




Bluetooth / 3 Mbps / CH00-DH3



Bluetooth / 3 Mbps / CH00-DH1

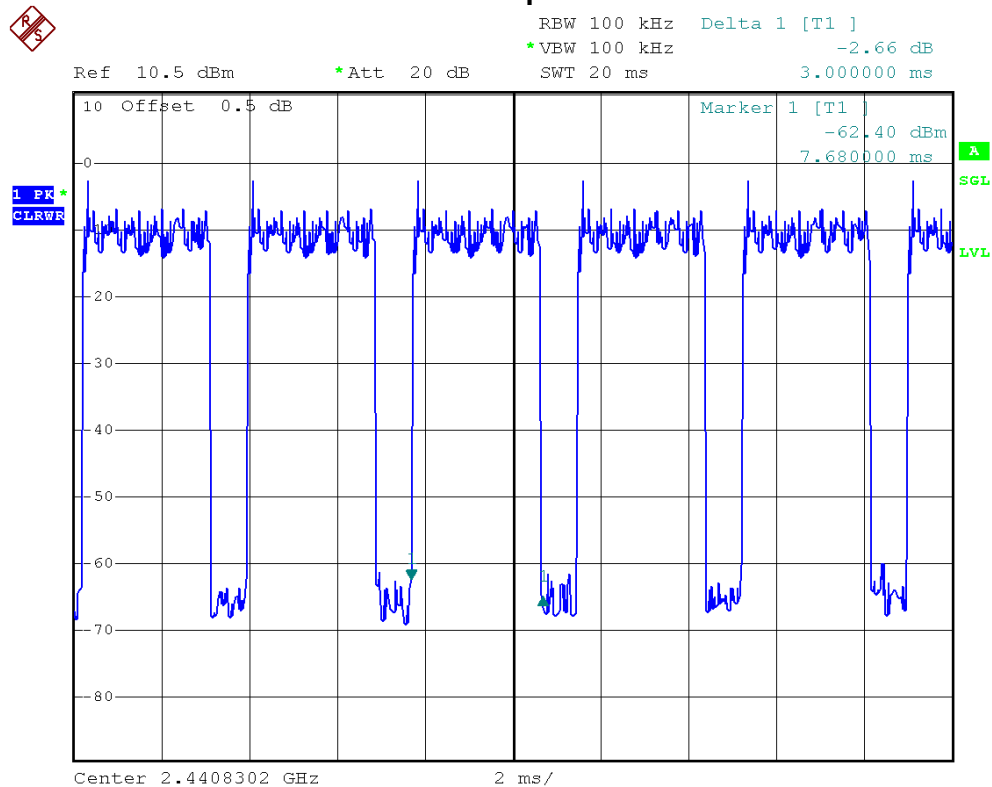




EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 3 Mbps / CH39-DH5/DH3/DH1		

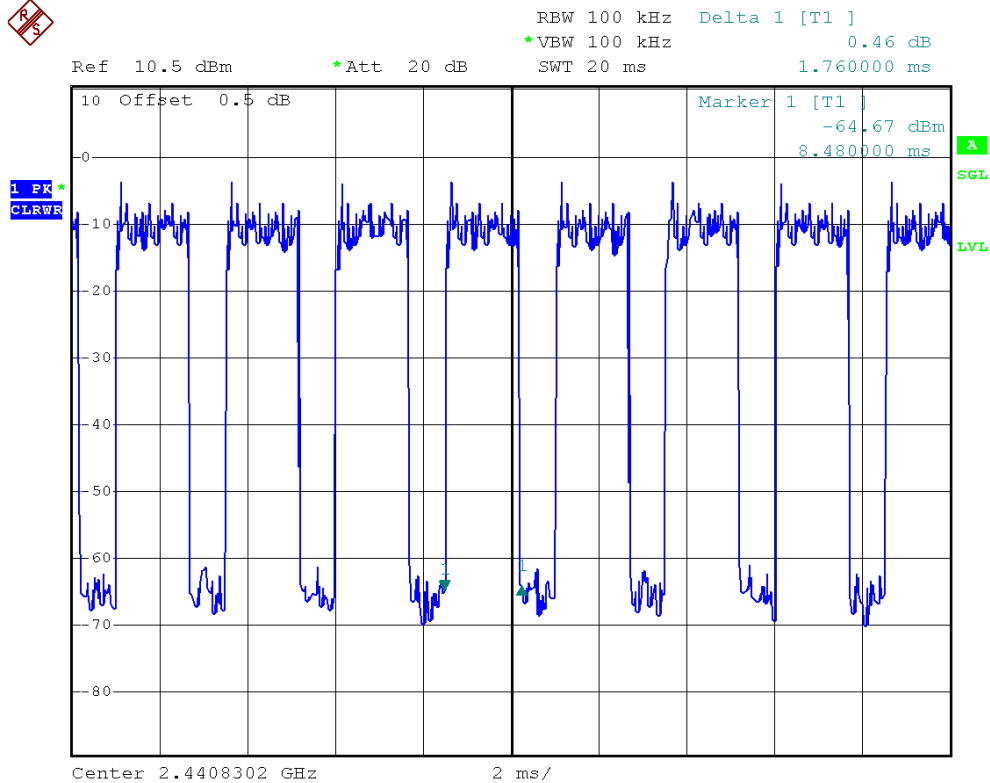
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2441 MHz	3.0000	0.3200	0.4000
DH3	2441 MHz	1.7600	0.2816	0.4000
DH1	2441 MHz	0.5200	0.1664	0.4000

Bluetooth / 3 Mbps / CH39-DH5

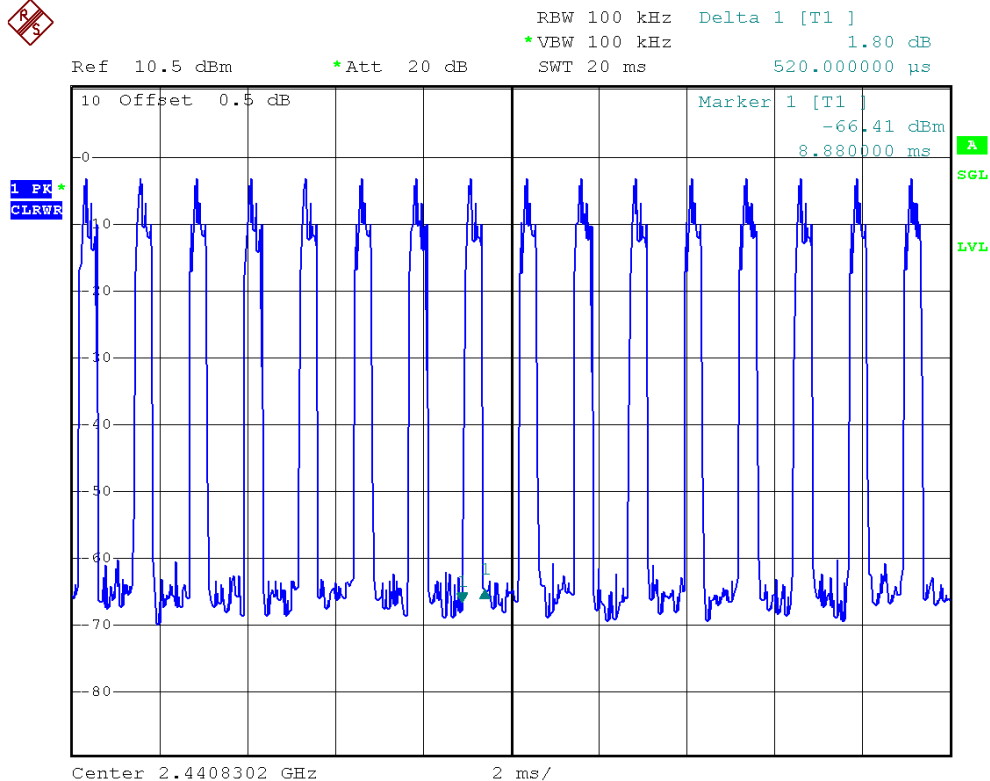




Bluetooth / 3 Mbps / CH39-DH3



Bluetooth / 3 Mbps / CH39-DH1

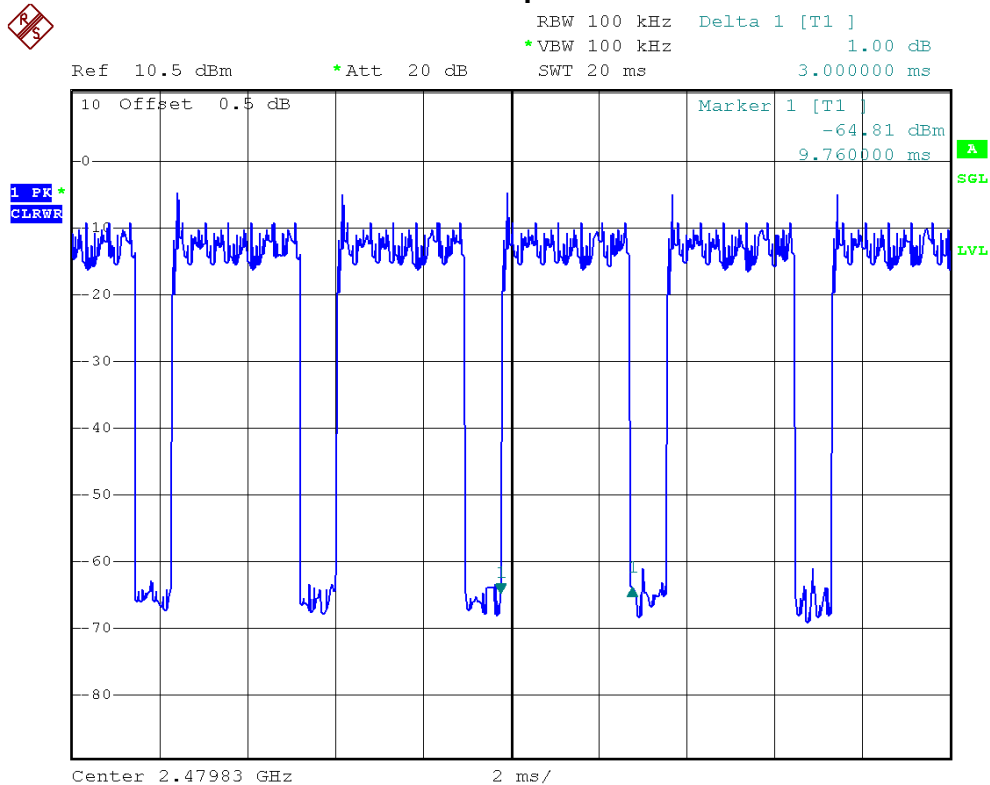




EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 3 Mbps / CH78-DH5/DH3/DH1		

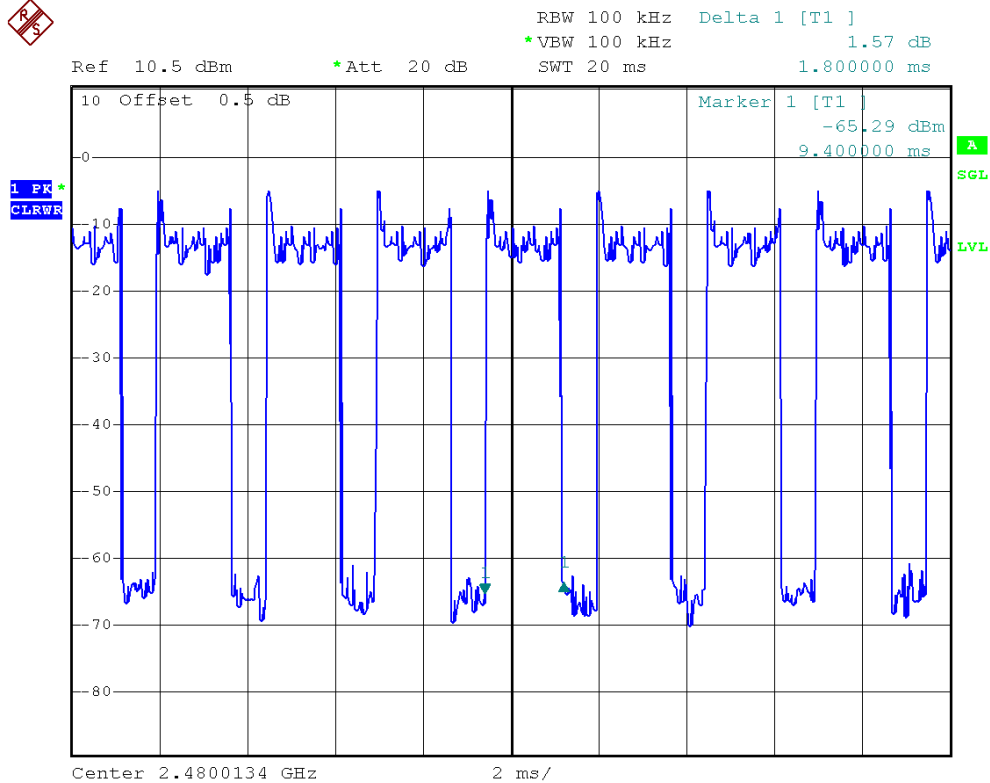
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2480 MHz	3.0000	0.3200	0.4000
DH3	2480 MHz	1.8000	0.2880	0.4000
DH1	2480 MHz	0.5600	0.1792	0.4000

Bluetooth / 3 Mbps / CH78-DH5

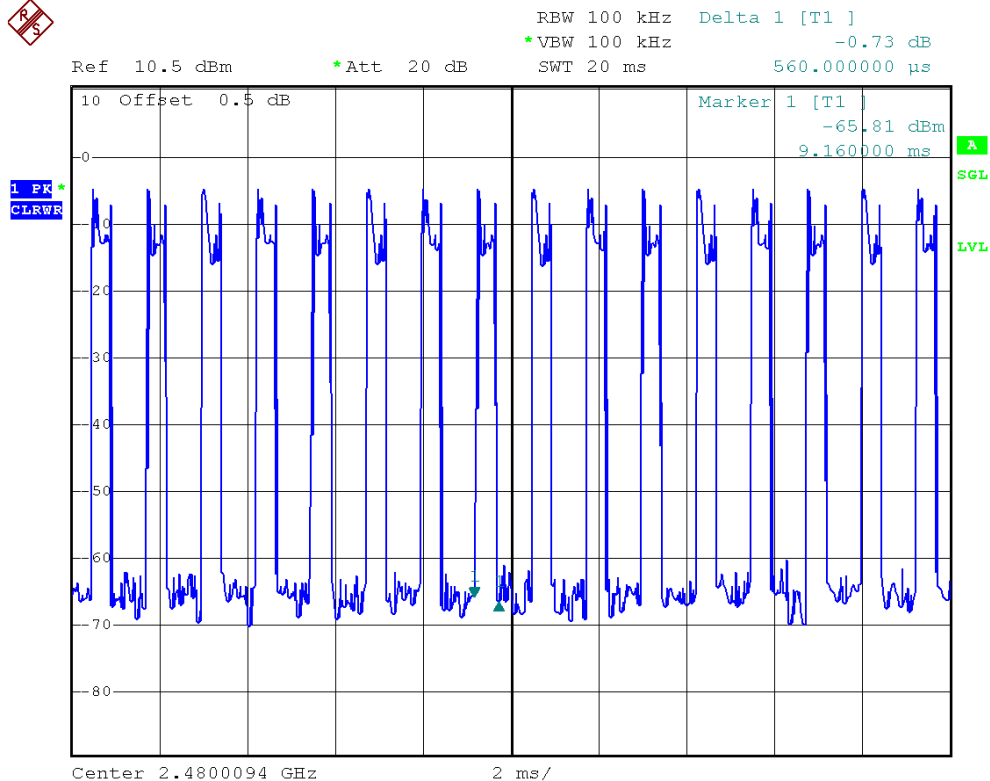




Bluetooth / 3 Mbps / CH78-DH3



Bluetooth / 3 Mbps / CH78-DH1



**7. HOPPING CHANNEL SEPARATION MEASUREMENT & BANDWITH TEST****7.1 APPLIED PROCEDURES / 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.

7.2 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 06, 2012

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

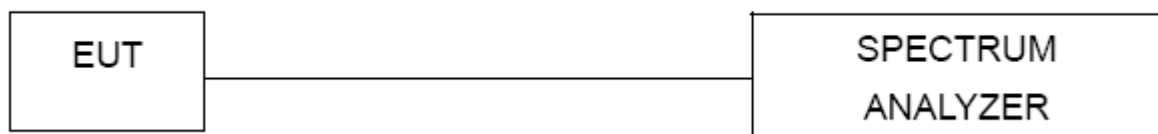
Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.3 TEST PROCEDURE

- 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.

7.4 DEVIATION FROM STANDARD

No deviation.

7.5 TEST SETUP**7.6 EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

**7.7 TEST RESULTS**

EUT :	RF Module	Model Name :	R8000
Temperature :	26 ° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 1 Mbps / CH00, CH39, CH78		

Frequency	Channel Separation (MHz)	99% Occupied BW (MHz)	20 dB Bandwidth (MHz)	Two-thirds of the 20 dB Bandwidth	Result
2402 MHz	1.01	0.876	0.936	0.624	PASS
2441 MHz	1.00	0.880	0.932	0.621	PASS
2480 MHz	1.00	0.864	0.936	0.624	PASS

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



Bluetooth / 1 Mbps / CH00-Channel Separation



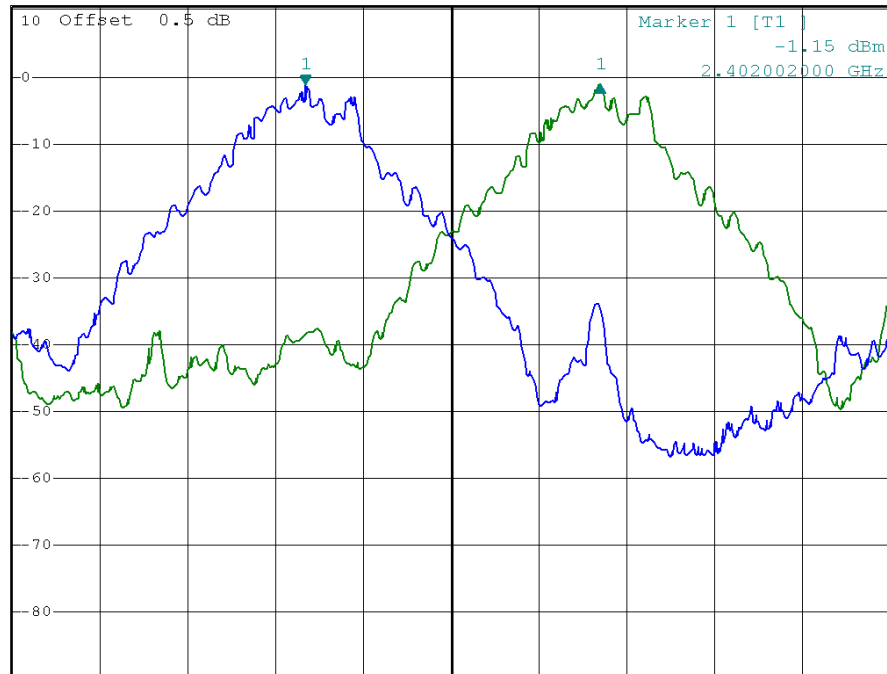
*RBW 30 kHz Delta 1 [T3]
VBW 100 kHz 0.08 dB
*SWT 20 ms 1.008000000 MHz

Ref 10.5 dBm

*Att 20 dB

1 PK
VIEW

3 PK
VIEW



Center 2.4025 GHz

300 kHz/

Span 3 MHz

Bluetooth / 1 Mbps / CH00- 20dB Bandwidth

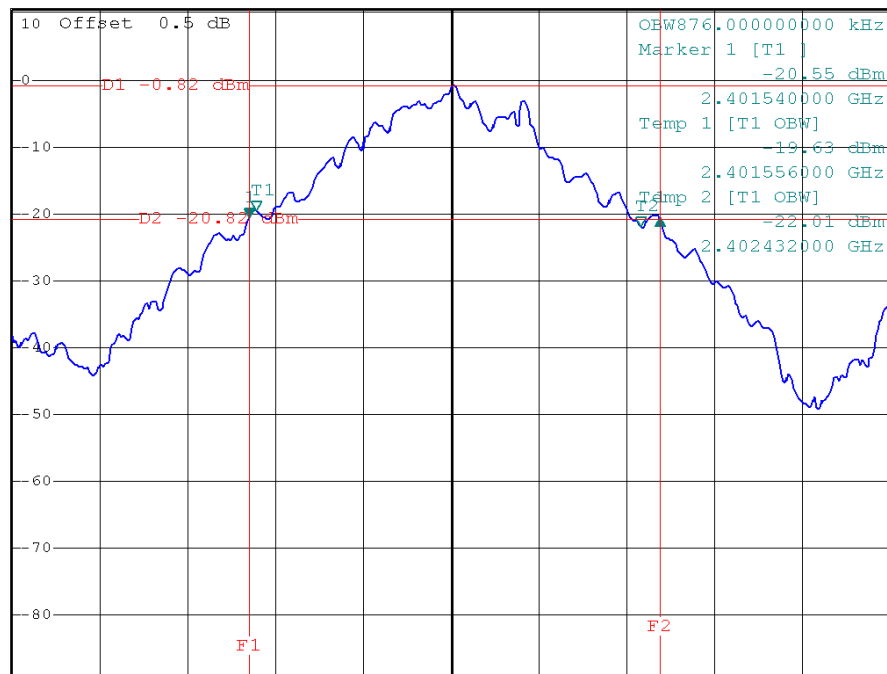


*RBW 30 kHz Delta 1 [T1]
*VBW 300 kHz -0.00 dB
SWT 2.5 ms 936.000000000 kHz

Ref 10.5 dBm

*Att 20 dB

1 PK
VIEW



Center 2.402 GHz

200 kHz/

Span 2 MHz



Bluetooth / 1 Mbps / CH39-Channel Separation



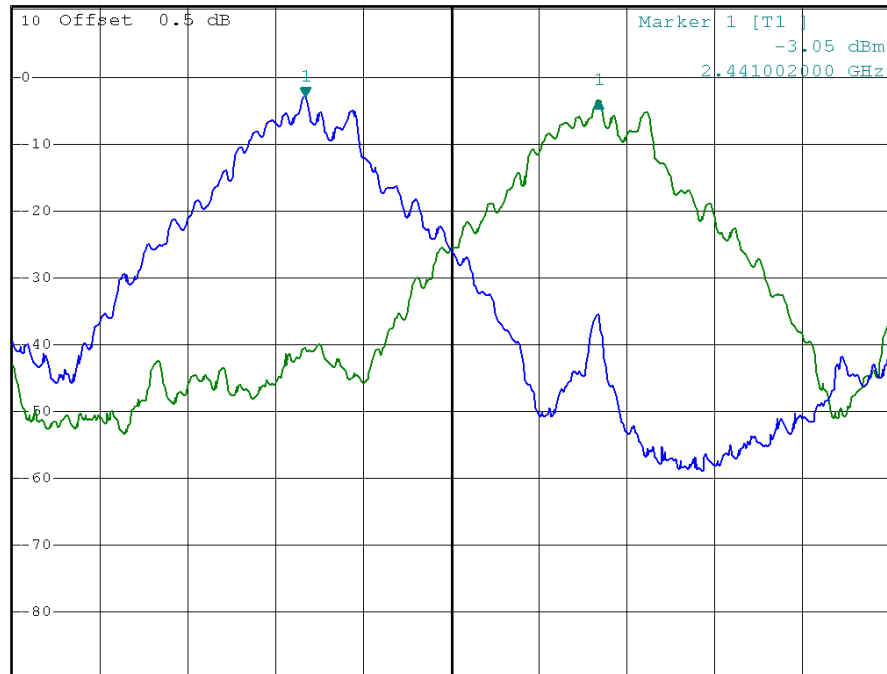
*RBW 30 kHz Delta 1 [T3]
VBW 100 kHz -0.39 dB
*SWT 20 ms 1.002000000 MHz

Ref 10.5 dBm

*Att 20 dB

1 PK
VIEW

3 PK
VIEW



Bluetooth / 1 Mbps / CH39- 20dB Bandwidth

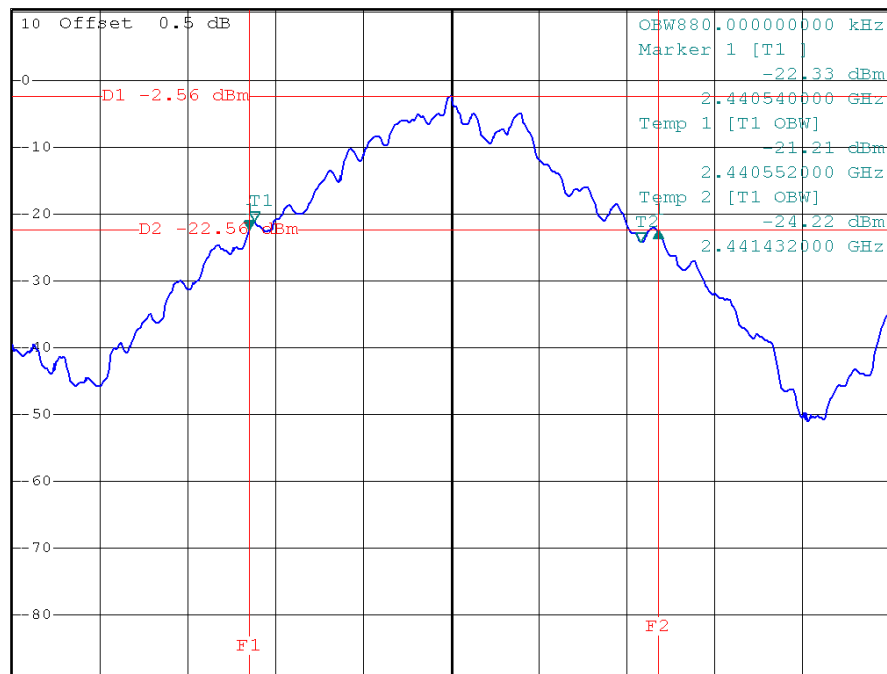


*RBW 30 kHz Delta 1 [T1]
*VBW 300 kHz -0.03 dB
SWT 2.5 ms 932.000000000 kHz

Ref 10.5 dBm

*Att 20 dB

1 PK
VIEW





Bluetooth / 1 Mbps / CH78-Channel Separation



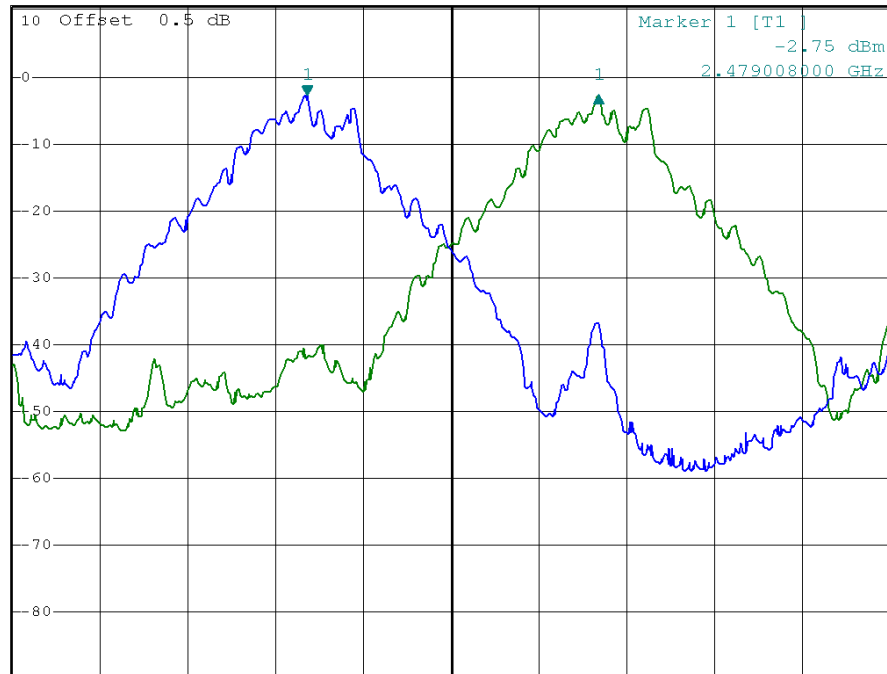
*RBW 30 kHz Delta 1 [T3]
*VBW 100 kHz -0.13 dB
*SWT 20 ms 996.000000000 kHz

Ref 10.5 dBm

*Att 20 dB

1 PK
VIEW

3 PK
VIEW



Center 2.4795 GHz

300 kHz/

Span 3 MHz

Bluetooth / 1 Mbps / CH78- 20dB Bandwidth



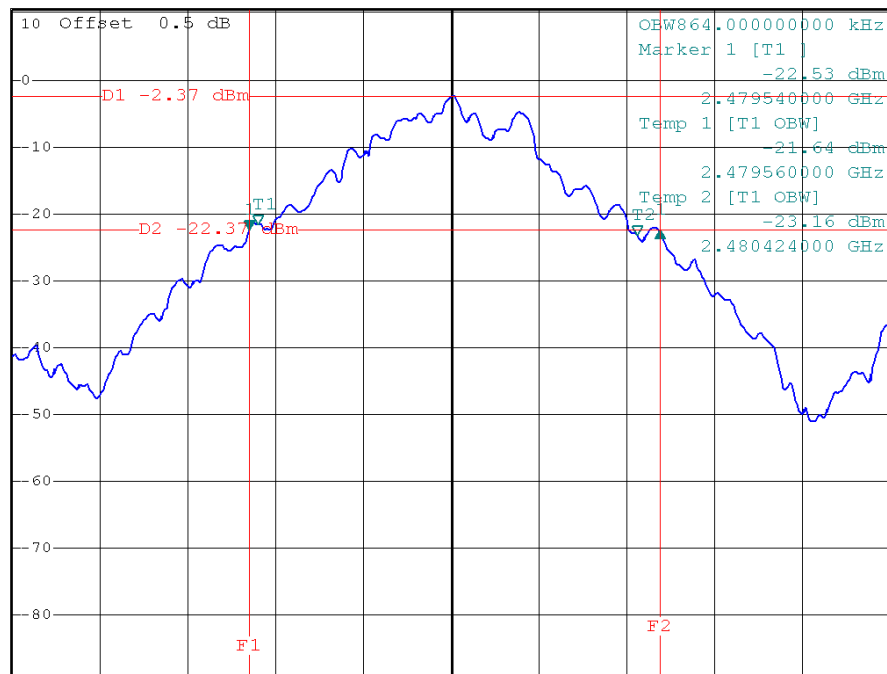
*RBW 30 kHz Delta 1 [T1]
*VBW 300 kHz -0.02 dB
SWT 2.5 ms 936.000000000 kHz

Ref 10.5 dBm

*Att 20 dB

1 PK
VIEW

3 PK
VIEW



Center 2.48 GHz

200 kHz/

Span 2 MHz



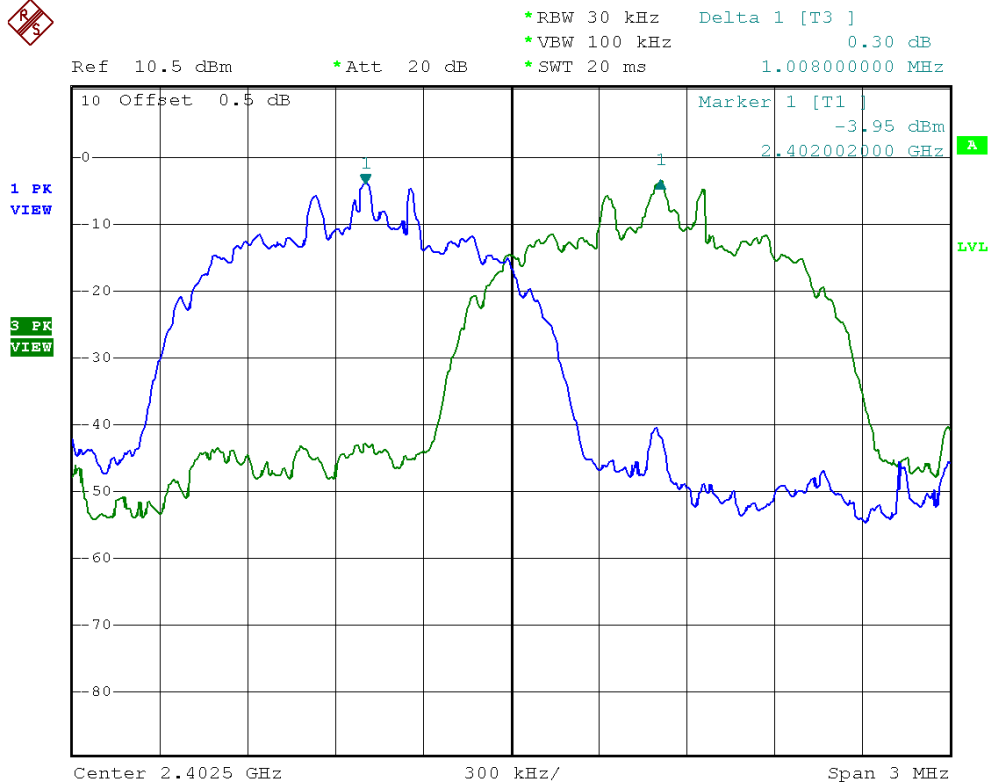
EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 3 Mbps / CH00, CH39, CH78		

Frequency	Channel Separation (MHz)	99% Occupied BW (MHz)	20 dB Bandwidth (MHz)	Two-thirds of the 20 dB Bandwidth	Result
2402 MHz	1.00	1.164	1.276	0.851	PASS
2441 MHz	1.00	1.164	1.264	0.843	PASS
2480 MHz	1.00	1.164	1.264	0.843	PASS

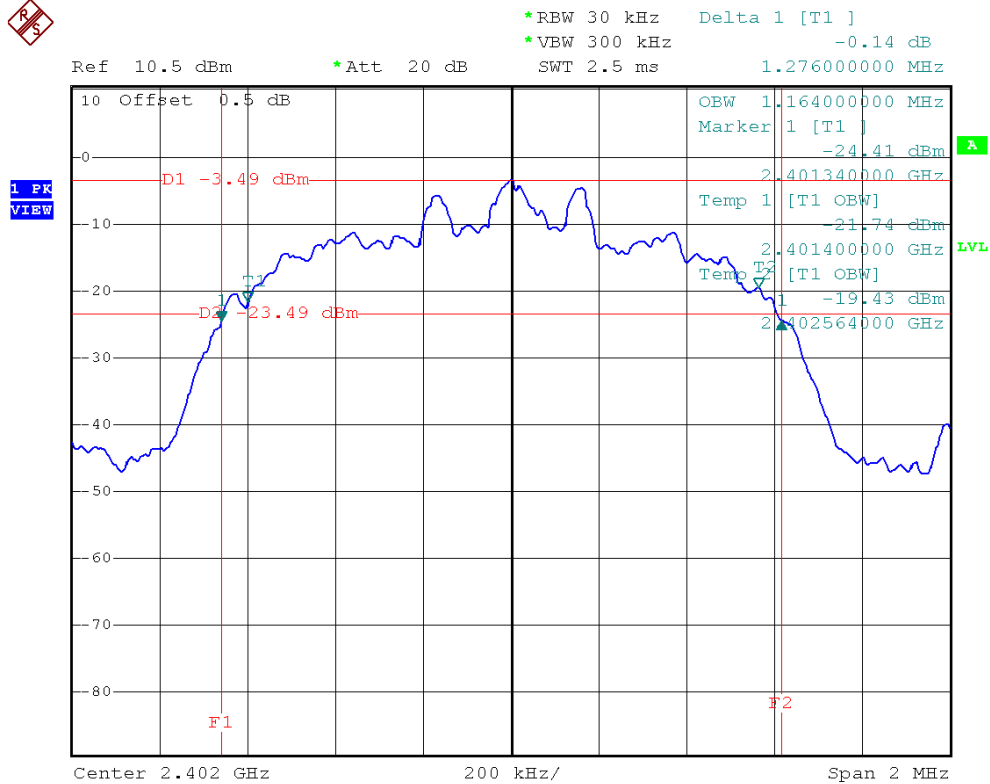
Ch. Separation Limits: >25 KHz or >2/3 of 20dB bandwidth



Bluetooth / 3 Mbps / CH00-Channel Separation



Bluetooth / 3 Mbps / CH00- 20dB Bandwidth



Bluetooth / 3 Mbps / CH39-Channel Separation



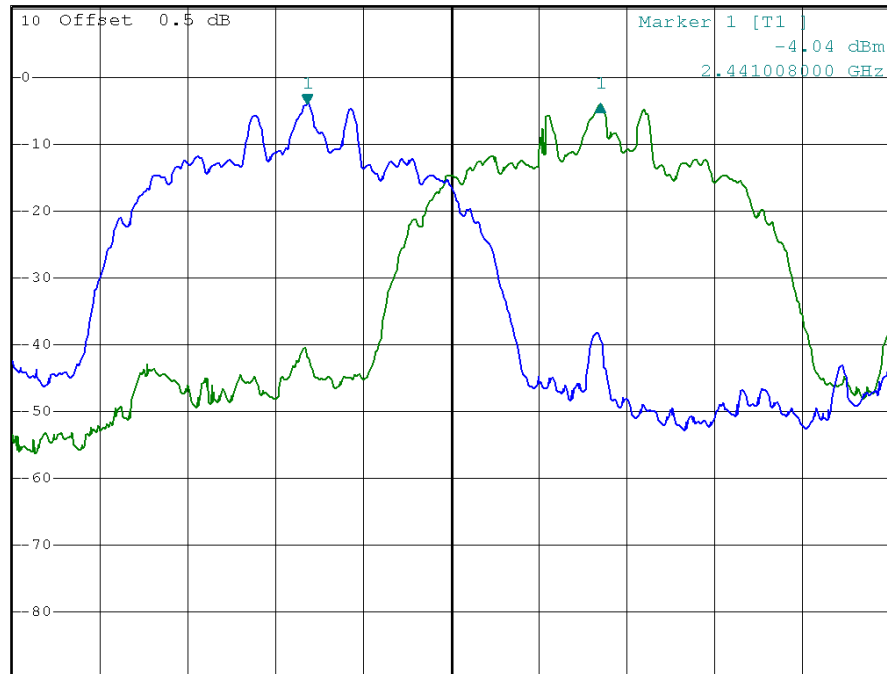
*RBW 30 kHz Delta 1 [T3]
*VBW 100 kHz -0.12 dB
*SWT 20 ms 1.002000000 MHz

Ref 10.5 dBm

*Att 20 dB

1 PK
VIEW

3 PK
VIEW



Center 2.4415 GHz

300 kHz/

Span 3 MHz

Bluetooth / 3 Mbps / CH39- 20dB Bandwidth

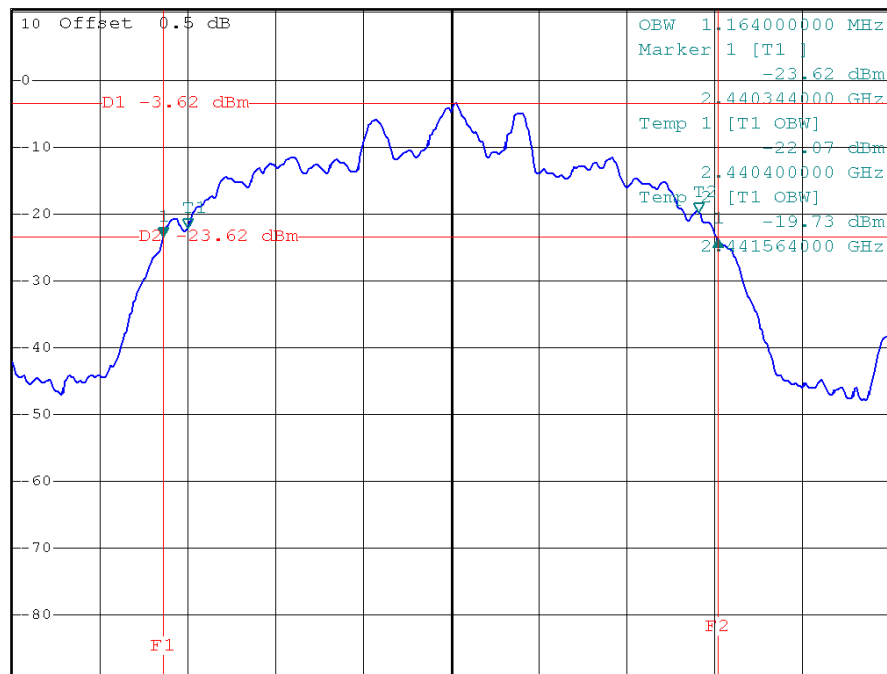


*RBW 30 kHz Delta 1 [T1]
*VBW 300 kHz -0.17 dB
SWT 2.5 ms 1.264000000 MHz

Ref 10.5 dBm

*Att 20 dB

1 PK
VIEW



Center 2.441 GHz

200 kHz/

Span 2 MHz



Bluetooth / 3 Mbps / CH78-Channel Separation



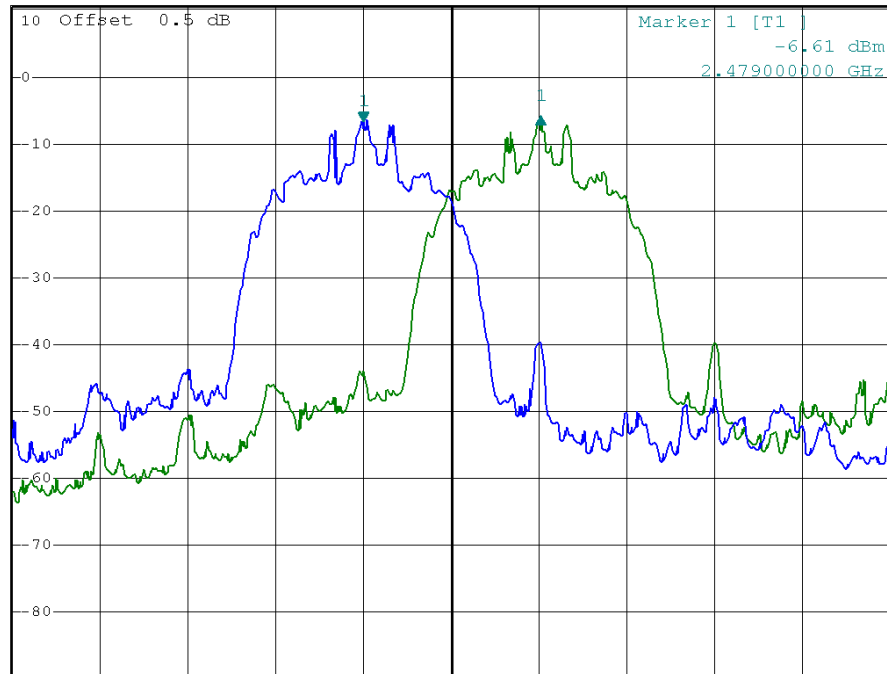
*RBW 30 kHz Delta 1 [T3]
*VBW 100 kHz 0.60 dB
*SWT 20 ms 1.010000000 MHz

Ref 10.5 dBm

*Att 20 dB

1 PK
VIEW

3 PK
VIEW



Center 2.4795 GHz

500 kHz/

Span 5 MHz

Bluetooth / 3 Mbps / CH78- 20dB Bandwidth

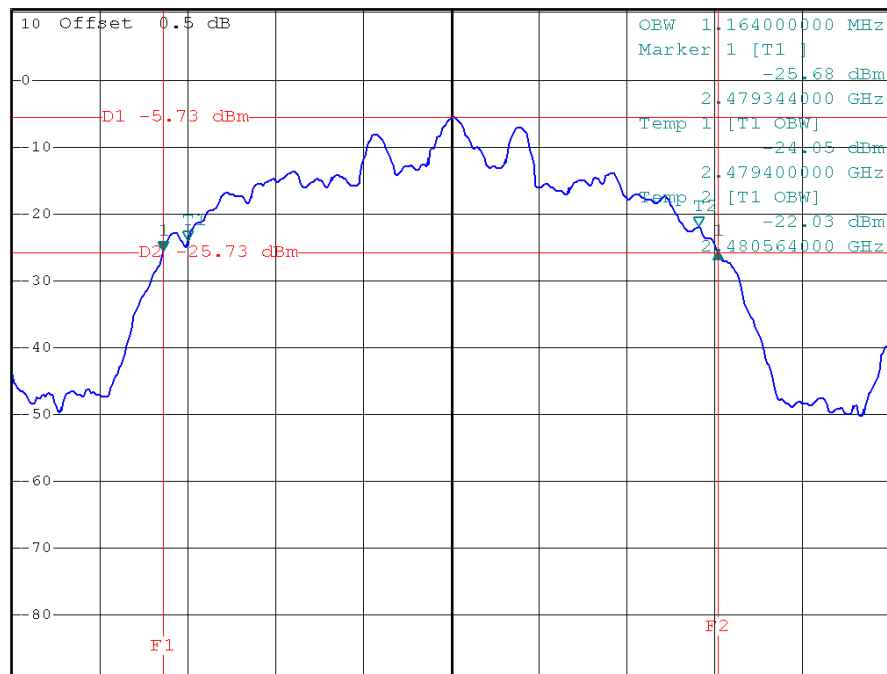


*RBW 30 kHz Delta 1 [T1]
*VBW 300 kHz 0.19 dB
SWT 2.5 ms 1.264000000 MHz

Ref 10.5 dBm

*Att 20 dB

1 PK
VIEW



Center 2.48 GHz

200 kHz/

Span 2 MHz

**8. PEAK OUTPUT POWER TEST****8.1 APPLIED PROCEDURES / LIMIT**

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(1)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

8.2 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 06, 2012

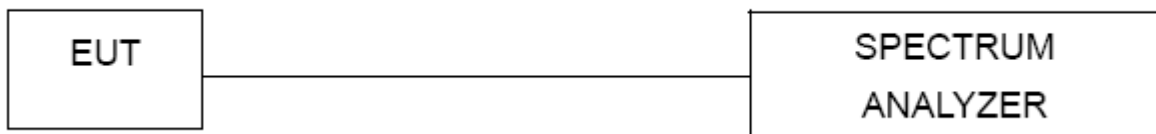
Remark: " N/A" denotes No Model Name , Serial No. or No Calibration specified.

8.3 TEST PROCEDURE

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

8.4 DEVIATION FROM STANDARD

No deviation.

8.5 TEST SETUP**8.6 EUT OPERATION CONDITIONS**

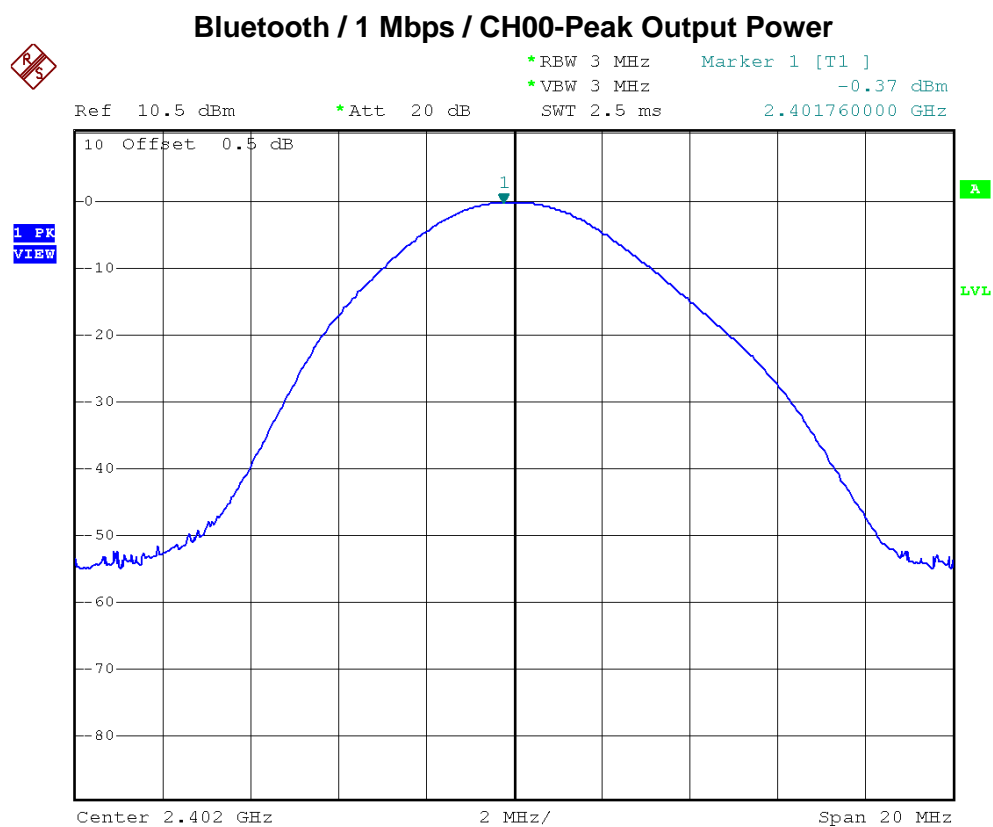
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.



8.7 TEST RESULTS

EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 1 Mbps / CH00, CH39, CH78		

Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
2402	-0.37	30	1
2441	-2.41	30	1
2480	-2.27	30	1





Bluetooth / 1 Mbps / CH39-Peak Output Power



*RBW 3 MHz Marker 1 [T1]
*VBW 3 MHz -2.41 dBm
SWT 2.5 ms 2.440760000 GHz

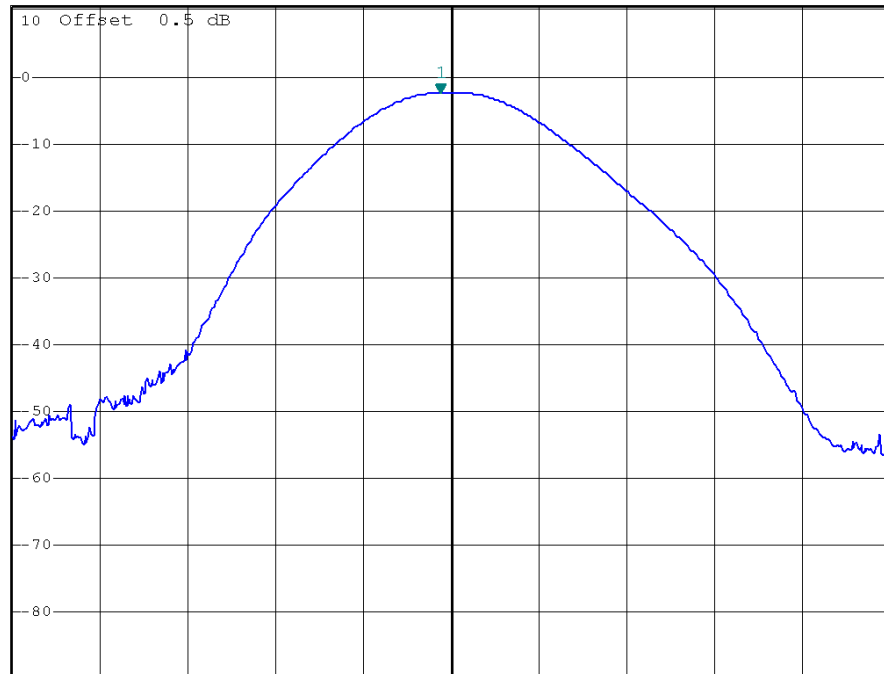
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 ms

2.440760000 GHz

1 PK
VIEW



Center 2.441 GHz

2 MHz/

Span 20 MHz

Bluetooth / 1 Mbps / CH78-Peak Output Power



*RBW 3 MHz Marker 1 [T1]
*VBW 3 MHz -2.27 dBm
SWT 2.5 ms 2.479880000 GHz

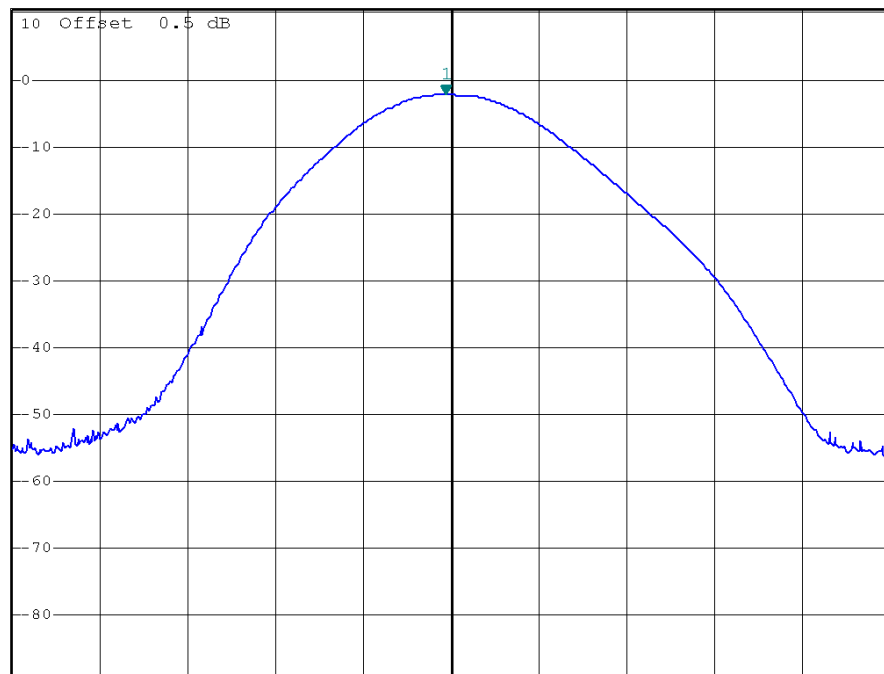
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 ms

2.479880000 GHz

1 PK
VIEW



Center 2.48 GHz

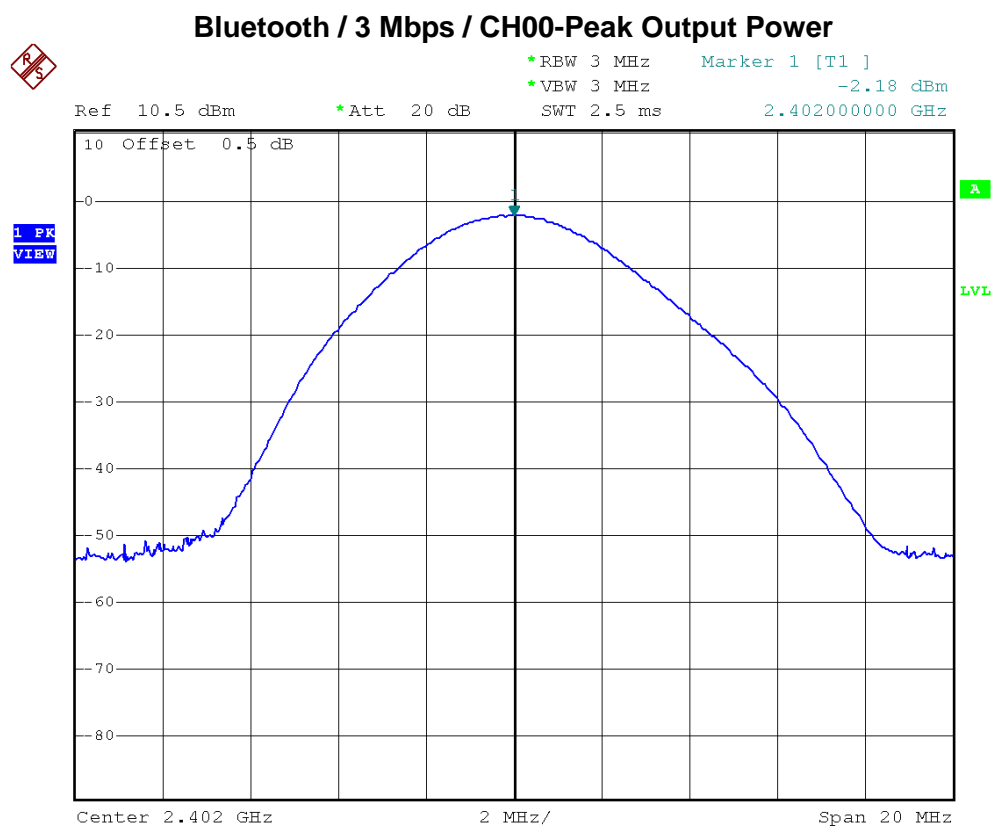
2 MHz/

Span 20 MHz



EUT :	RF Module	Model Name :	R8000
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 3 Mbps / CH00, CH39, CH78		

Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
2402	-2.18	30	1
2441	-2.17	30	1
2480	-9.71	30	1



Bluetooth / 3 Mbps / CH39-Peak Output Power



*RBW 3 MHz Marker 1 [T1]
*VBW 3 MHz -2.17 dBm
SWT 2.5 ms 2.441000000 GHz

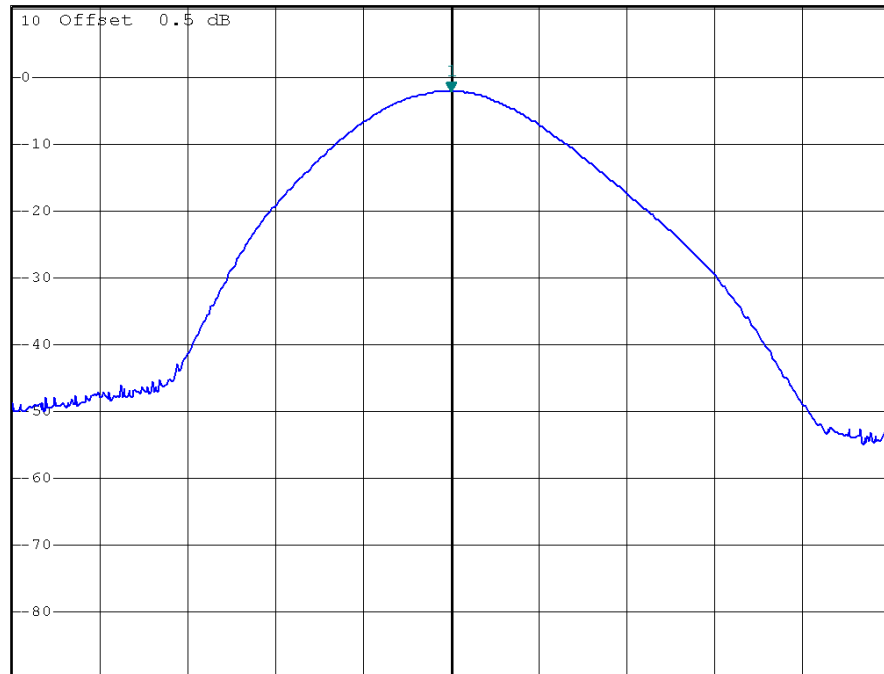
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 ms

2.441000000 GHz

1 PK
VIEW



Center 2.441 GHz

2 MHz/

Span 20 MHz

Bluetooth / 3 Mbps / CH78-Peak Output Power



*RBW 3 MHz Marker 1 [T1]
*VBW 3 MHz -9.71 dBm
SWT 2.5 ms 2.480000000 GHz

Ref 10.5 dBm

*Att 20 dB

SWT 2.5 ms

2.480000000 GHz

1 PK
VIEW



Center 2.48 GHz

2 MHz/

Span 20 MHz

**9. ANTENNA CONDUCTED SPURIOUS EMISSION****9.1 APPLIED PROCEDURES / 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.

Frequencies (MHz)	Field Strength (micorvolts/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

9.2 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 06, 2012

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

The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (other emission)	100 KHz /100 KHz for Peak

9.3 TEST PROCEDURE

- 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.

9.4 DEVIATION FROM STANDARD

No deviation.



9.5 TEST SETUP



9.6 EUT OPERATION CONDITIONS

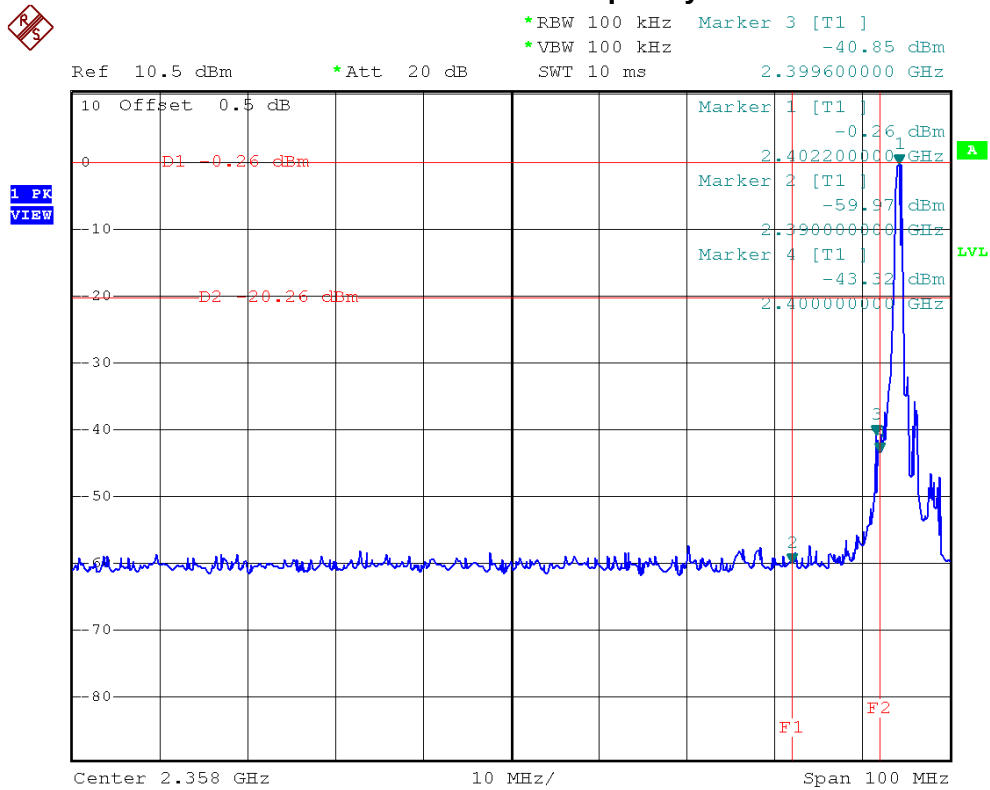
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

**9.7 TEST RESULTS**

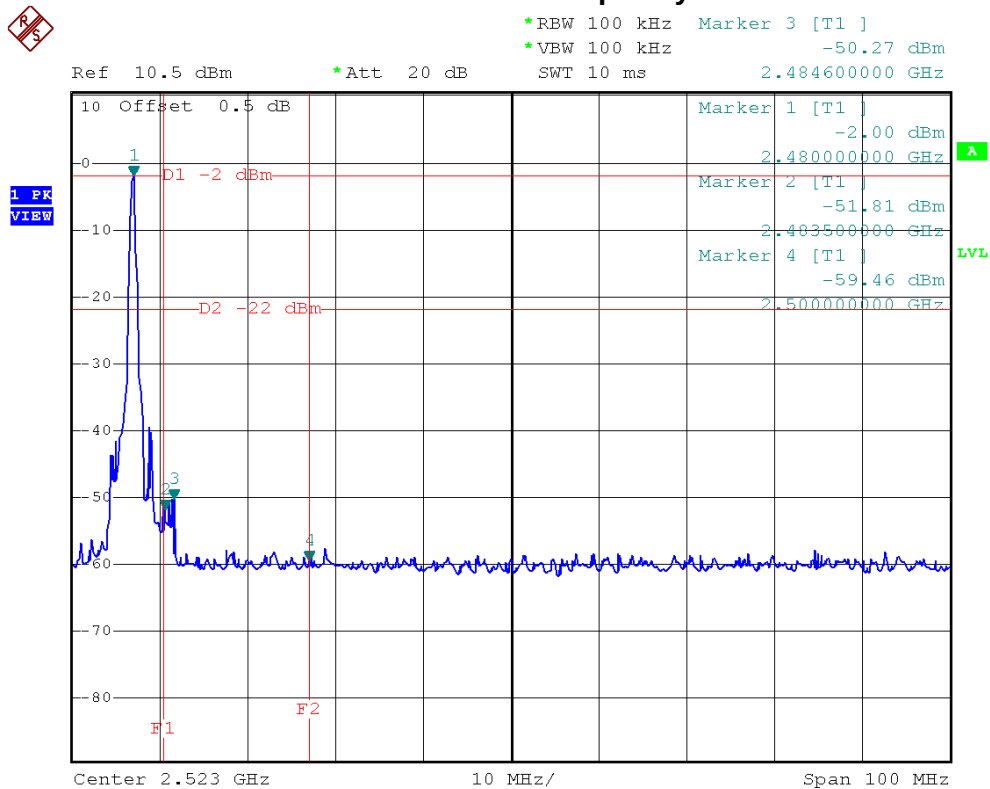
EUT :	RF Module	Model Name :	R8000
Temperature :	26 ° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 1 Mbps / CH00, CH39, CH78		

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)
2399.60	-40.85	2484.60	-50.27
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 / CH00-The max. radio frequency power in any 100kHz bandwidth outside the frequency band



Bluetooth / 1 Mbps / CH78-The max. radio frequency power in any 100 kHz bandwidth within the frequency band





Bluetooth / 1 Mbps / CH00-10 Harmonic of the frequency



*RBW 100 kHz Marker 2 [T1]
*VBW 100 kHz -46.45 dBm
SWT 2.5 s 4.772275000 GHz

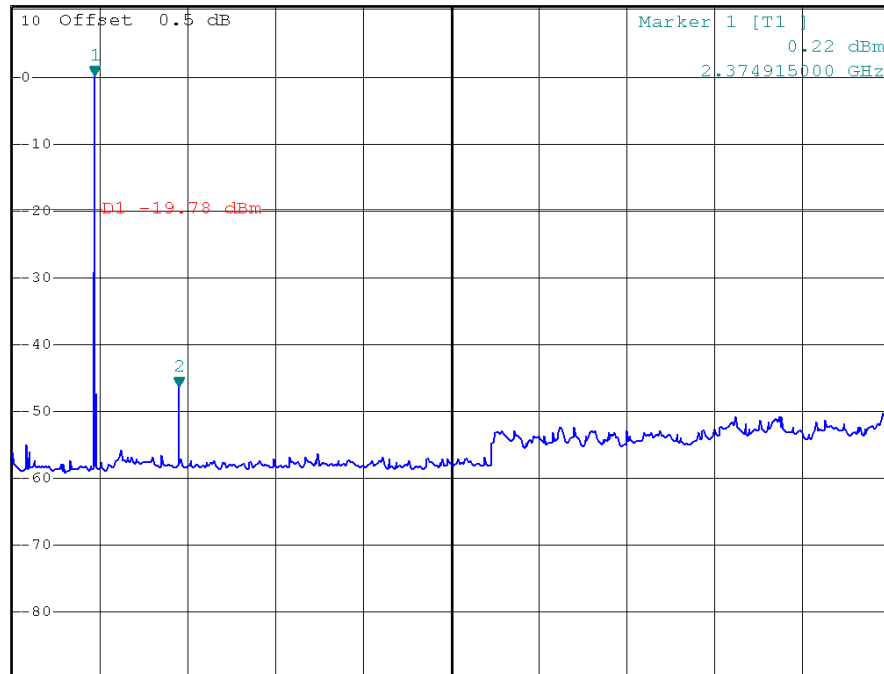
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 s

4.772275000 GHz

1 PK
VIEW



Center 12.51375 GHz

2.49725 GHz/

Span 24.9725 GHz

Bluetooth / 1 Mbps / CH39-10 Harmonic of the frequency



*RBW 100 kHz Marker 1 [T1]
*VBW 100 kHz -3.65 dBm
SWT 2.5 s 2.427120000 GHz

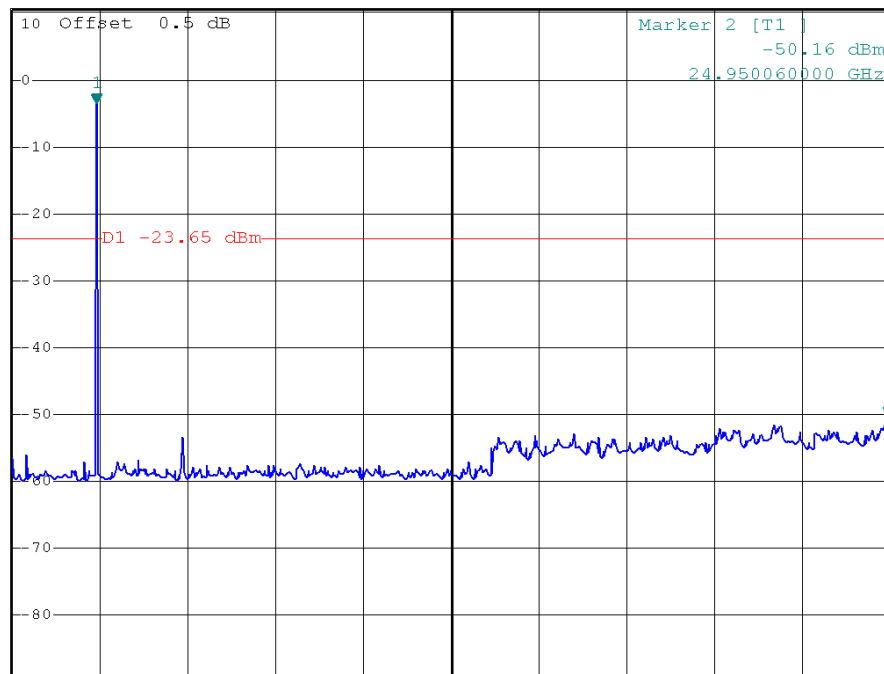
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 s

2.427120000 GHz

1 PK
VIEW



Start 30 MHz

2.497 GHz/

Stop 25 GHz



Bluetooth / 1 Mbps / CH78-10 Harmonic of the frequency



*RBW 100 kHz Marker 2 [T1]
*VBW 100 kHz -50.82 dBm
SWT 2.5 s 24.850180000 GHz

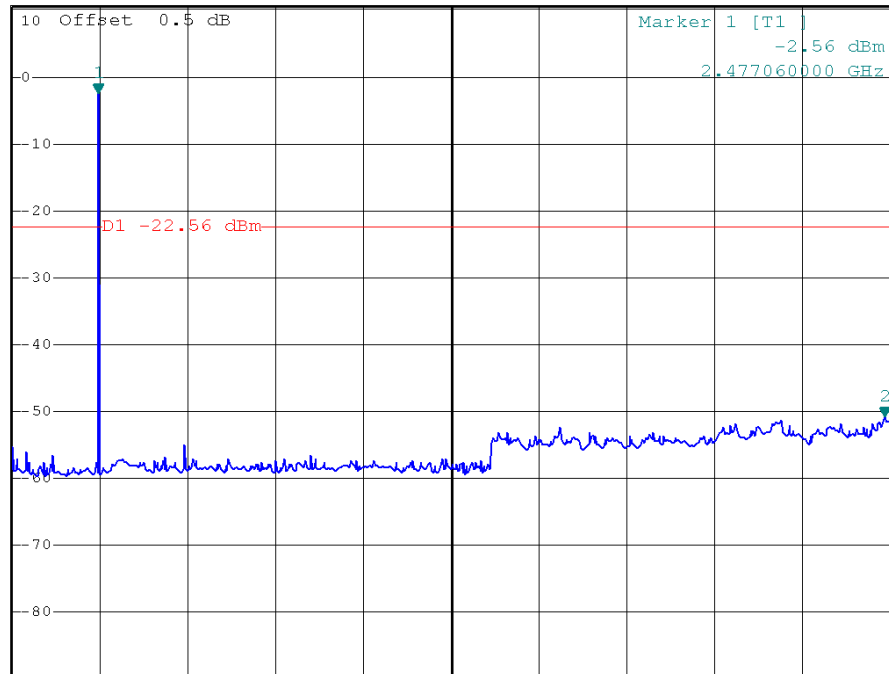
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 s

24.850180000 GHz

1 PK
VIEW



Start 30 MHz

2.497 GHz/

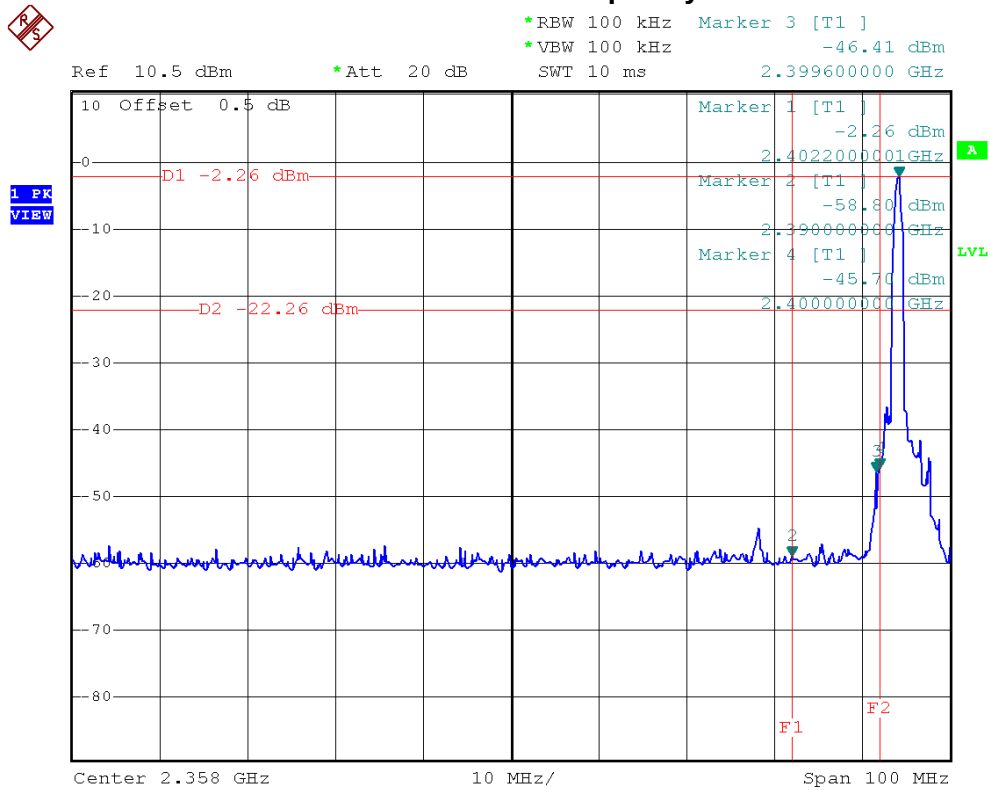
Stop 25 GHz



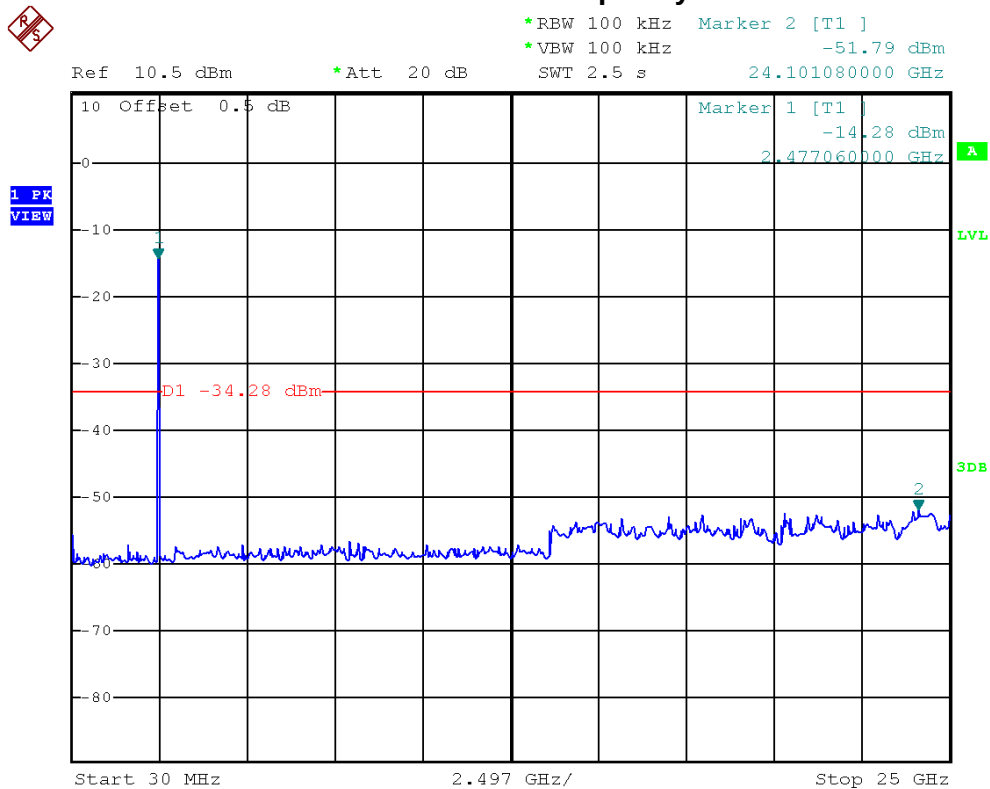
EUT :	RF Module	Model Name :	R8000
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.3V (Normal)		
Test Mode :	Bluetooth / 3 Mbps / CH00, CH39, CH78		

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)
2399.60	-46.41	2410.108	-51.79
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 / CH00-The max. radio frequency power in any 100kHz bandwidth outside the frequency band



Bluetooth / 3 Mbps / CH78-The max. radio frequency power in any 100 kHz bandwidth within the frequency band





Bluetooth / 3 Mbps / CH00-10 Harmonic of the frequency



*RBW 100 kHz Marker 2 [T1]
*VBW 100 kHz -45.11 dBm
SWT 2.5 s 1.590625000 GHz

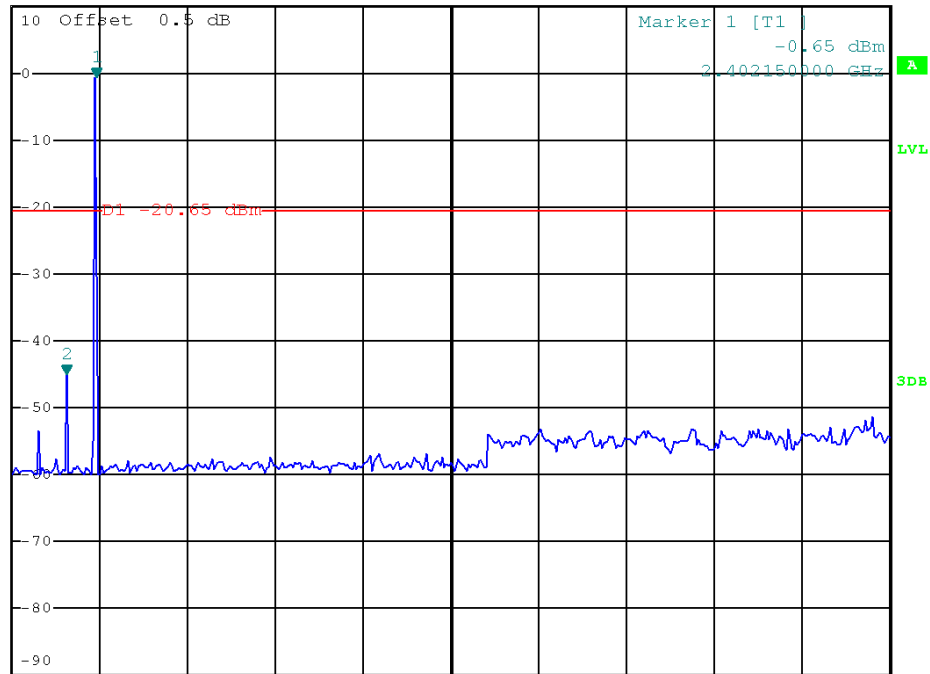
Ref 10 dBm

*Att 20 dB

SWT 2.5 s

1.590625000 GHz

1 PK
VIEW



Center 12.515 GHz

2.497 GHz/

Span 24.97 GHz

Bluetooth / 3 Mbps / CH39-10 Harmonic of the frequency



*RBW 100 kHz Marker 2 [T1]
*VBW 100 kHz -50.56 dBm
SWT 2.5 s 24.900120000 GHz

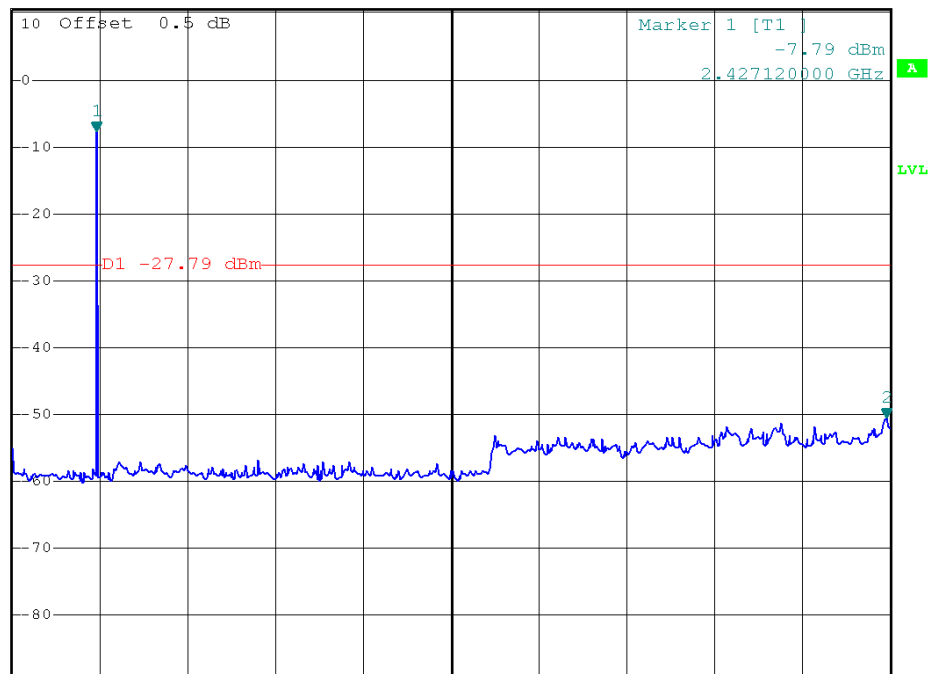
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 s

24.900120000 GHz

1 PK
VIEW



Start 30 MHz

2.497 GHz/

Stop 25 GHz



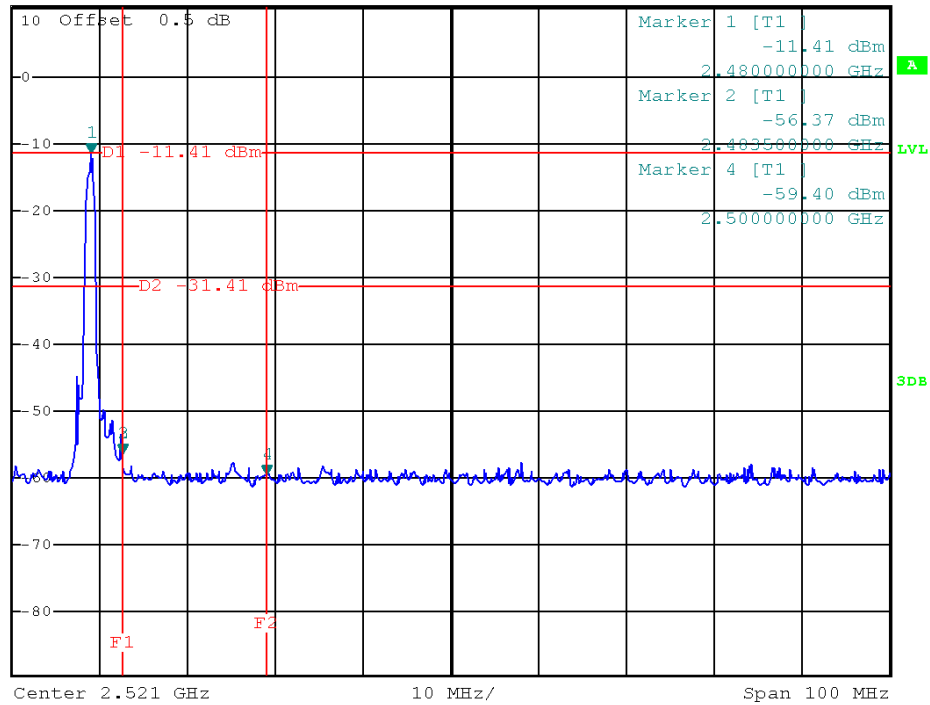
Bluetooth / 3 Mbps / CH78-10 Harmonic of the frequency



*RBW 100 kHz Marker 3 [T1]
*VBW 100 kHz -56.37 dBm

Ref 10.5 dBm *Att 20 dB SWT 10 ms 2.483500000 GHz

1 PK
VIEW





10. RF EXPOSURE TEST

10.1 APPLIED PROCEDURES / LIMIT

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

10.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	Anritsu	ML2487A	6K00004714	Feb,20,2013
2	Power Meter Sensor	Anritsu	MA2491A	34138	Feb,20,2013

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

**10.3 MPE CALCULATION METHOD**

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Peak RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, $d=0.2\text{m}$, as well as the gain of the used antenna, the RF power density can be obtained

10.4 DEVIATION FROM STANDARD

No deviation.

10.5 TEST SETUP**10.6 EUT OPERATION CONDITIONS**

The power is too low, so no RF calculations are needed.