



Bluetooth Radio Test Report

FCC ID: Q3N-1664

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

Issued Date : Jan. 17, 2012

Project No. : 1112114

Equipment : Bluetooth Barcode Scanner

Model Name : 1664

Applicant : CIPHERLAB CO., LTD.

Address : 12F, 333, Dunhua S. Rd., Sec. 2, Taipei,
Taiwan

Tested by: Neutron Engineering Inc. EMC Laboratory

Date of Receipt: Dec. 21, 2011

Date of Test: Dec. 21, 2011

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Declaration

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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.



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12 . HISTORY

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1. CERTIFICATION

Equipment : Bluetooth Barcode Scanner
Brand Name : CIPHERLAB
Model Name : 1664
Applicant : CIPHERLAB CO., LTD.
Date of Test : Dec. 21, 2011
Standards : FCC Part15, Subpart C / 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-1-1112114) 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:

FCC Part15, Subpart C			
Standard Section	Test Item	Judgment	Remark
FCC			
15.207	Conducted Emission	PASS	
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.



2.1 TEST FACILITY

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

- C02:** (VCCI RN: C-3477; FCC RN: 614388; FCC DN: TW1054)
1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)
- 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 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 Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
C02	ANSI	150 kHz ~ 30 MHz	2.59	

B. Radiated Measurement :

Test Site	Item	Measurement Frequency Range	Uncertainty	NOTE
CB08	Radiated Emission at 3m	Horizontal Polarization	30 - 00MHz	3.35 dB
			200 - 1000MHz	.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	Bluetooth Barcode Scanner	
Brand Name	CIPHERLAB	
Model Name	1664	
OEM Brand/Model Name	N/A	
Model Difference	N/A	
Product Description	The EUT is a Bluetooth Barcode Scanner.	
	Operation Frequency:	2402~2480 MHz
	Modulation Type:	FHSS(GFSK,8DPSK)
	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: 4.16 dBm 3 Mbps: 3.00 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	1. Battery supplied. 2. Supplied from PC USB port.	
Power Rating	1. Battery: DC 3.7V 850mAh 2. I/P: DC 5V	
Products Covered	Please refer to the User's Manual	
Connecting I/O Port(s)	1 * Li-ion BATTERY PACK: BA-002850 1 * USB Cable	
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	CIPHERLAB	1664	PIFA	Soldered	3.14



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	1 Mbps / CH00, CH39, CH78
Mode 2	3 Mbps / CH00, CH39, CH78

For Conducted Test	
Final Test Mode	Description
Mode 1	1 Mbps / CH39,

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

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

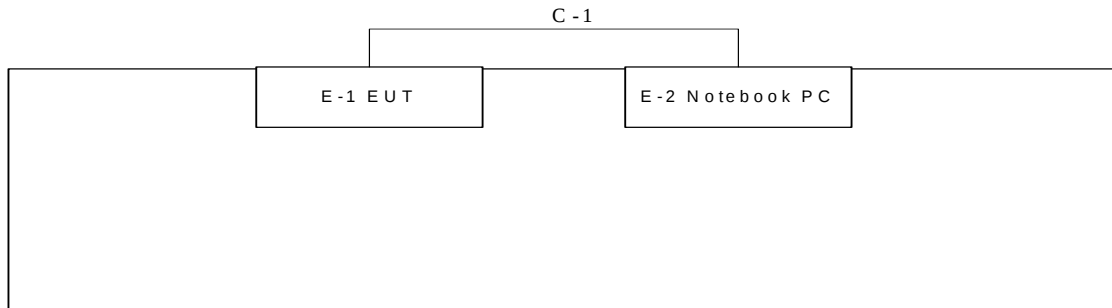
Data Rate	1 Mbps		
Test software Version	1664 RF Command		
Frequency	2402 MHz	2441 MHz	2480 MHz
Power Parameters	3C	3C	3C

Data Rate	3 Mbps		
Test software Version	1664 RF Command		
Frequency	2402 MHz	2441 MHz	2480 MHz
Power Parameters	69	69	69



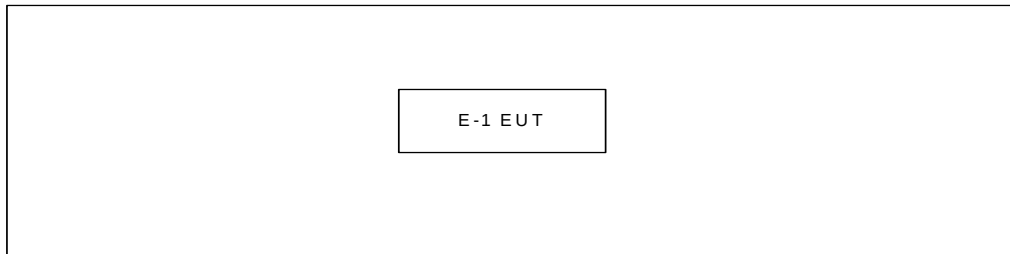
3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

For Conducted Test



C -1 USB Cable

For Radiated Emission Test



**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	Bluetooth Barcode Scanner	CIPHERLAB	1664	Q3N-1664	N/A	EUT
E-2	Notebook PC	DELL	D600	DOC	7T390 A03	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	NO	1.0M	-

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 CONDUCTED EMISSION MEASUREMENT****4.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)**

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
- (3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
Margin Level = Measurement Value – Limit Value

4.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	Jun. 06, 2012
2	Test Cable	TIMES	CFD300-NL	130	Jun. 16, 2012
3	EMI Test Receiver	R&S	ESCI	100080	Mar. 15, 2012
4	EMI Test Receiver	R&S	ESCS30	833364/017	Aug. 02, 2012

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

4.1.3 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

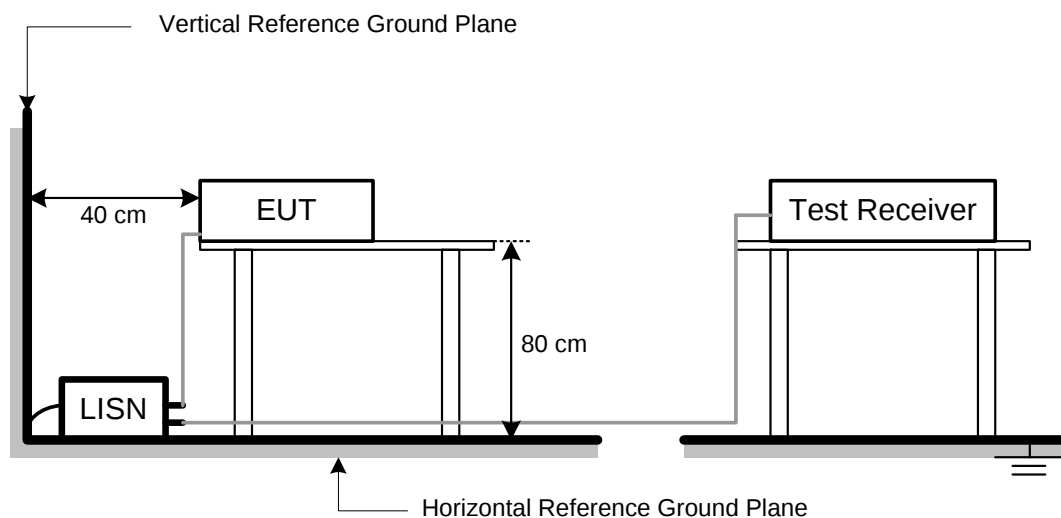
NOTE:

- Reading in which marked as Peak, QP or AVG means measurements by using are Quasi-Peak or Average Mode with Detector BW=9 kHz; SPA setting in RBW=10 kHz, VBW =10 kHz, Swp. Time = 0.2 sec./ MHz.
- All readings are Peak Mode value unless otherwise stated QP or AVG in column of Note. If the Peak or QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only Peak or QP Mode was measured, but AVG Mode didn't perform.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP





4.1.6 EUT OPERATING CONDITIONS

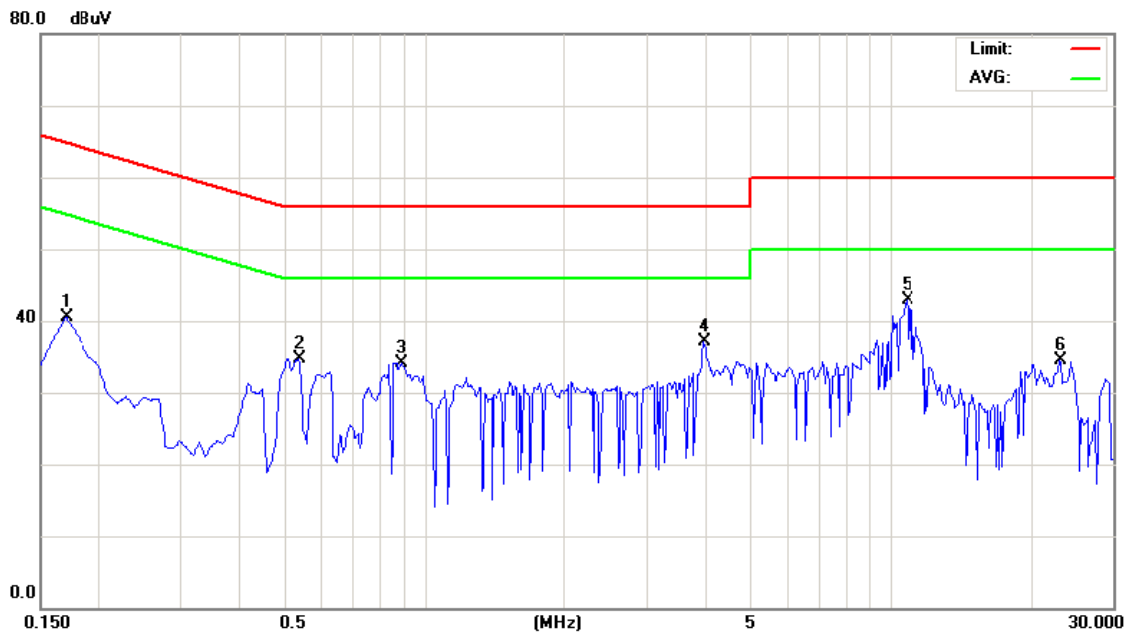
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



4.1.7 TEST RESULTS

EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	24° C	Relative Humidity :	46%
Test Voltage :	AC 120V/60Hz (System)		
Test Mode :	1 Mbps / CH39,		

Phase: Line

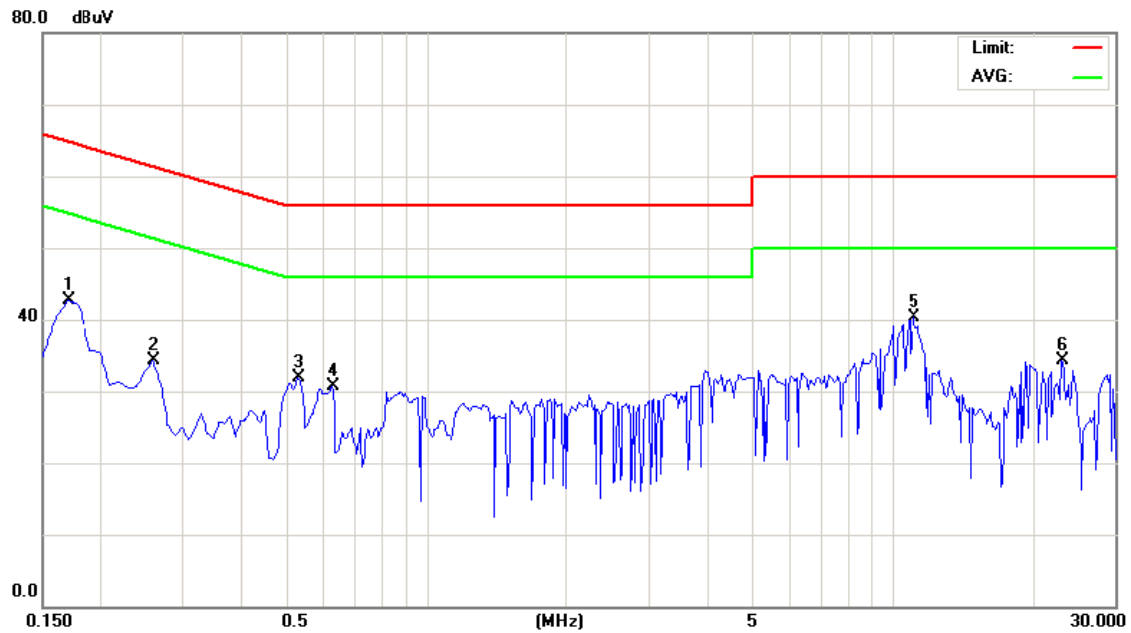


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1700	30.93	9.60	40.53	64.96	-24.43	peak	
2	0.5400	25.17	9.63	34.80	56.00	-21.20	peak	
3	0.8899	24.57	9.61	34.18	56.00	-21.82	peak	
4	3.9700	27.47	9.69	37.16	56.00	-18.84	peak	
5 *	10.8100	33.17	9.82	42.99	60.00	-17.01	peak	
6	23.1299	24.57	9.92	34.49	60.00	-25.51	peak	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	24 °C	Relative Humidity :	46%
Test Voltage :	AC 120V/60Hz (System)		
Test Mode :	1 Mbps / CH39,		

Phase: Neutral



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1700	33.11	9.60	42.71	64.96	-22.25	peak	
2		0.2599	24.65	9.60	34.25	61.43	-27.18	peak	
3		0.5299	22.20	9.62	31.82	56.00	-24.18	peak	
4		0.6299	21.14	9.61	30.75	56.00	-25.25	peak	
5	*	11.0699	30.51	9.83	40.34	60.00	-19.66	peak	
6		23.1299	24.29	9.96	34.25	60.00	-25.75	peak	

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 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 (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

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



4.2.2 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Aug. 30, 2012
2	Microwave Pre-amplifier	Agilent	8449B	3008A01714	Apr. 18, 2012
3	Microflex Cable	N/A	N/A	1m	May. 18, 2012
4	Microflex Cable	AISI	S104-SMAP-1	10m	Aug. 21, 2012
5	Microflex Cable	N/A	N/A	3m	Aug. 21, 2012
6	Test Cable	N/A	LMR-400	966_12m	Jun. 16, 2012
7	Test Cable	N/A	LMR-400	966_3m	Jun. 16, 2012
8	Pre-Amplifier	EMC	EMC-330	980001	Jun. 02, 2012
9	Log-Bicon Antenna	Schwarzbeck	VULB9168-352	9168-352	Jun. 20, 2012

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



4.2.3 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; SPA setting in RBW=120 kHz, VBW =120 kHz, Swp. Time = 0.3 sec./ MHz.
- 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)

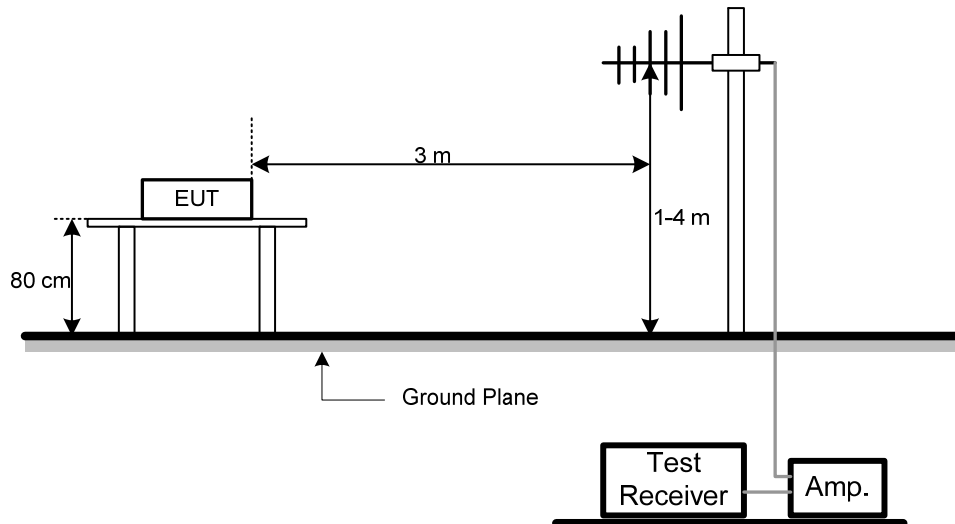
- a. Reading in which marked as Peak means measurements by using are Peak Mode with instrument setting in RBW= 1 MHz, VBW= 1 MHz, Swp. Time = Auto.
Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW= 1 MHz, VBW= 10 Hz, Swp. Time = Auto.
- b. All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

4.2.4 DEVIATION FROM TEST STANDARD

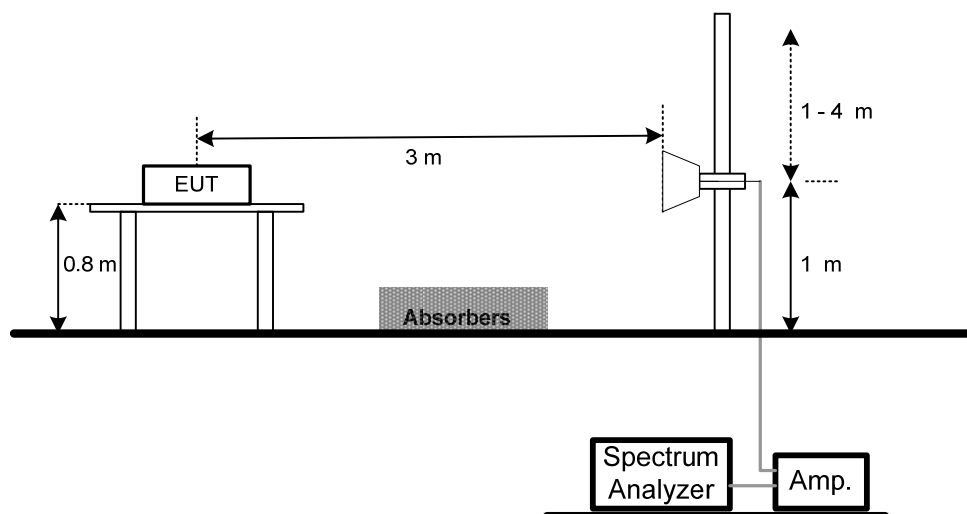
No deviation

4.2.5 TEST SETUP

Radiated Emission Test Set-Up Frequency 30 - 1000MHz



Radiated Emission Test Set-Up Frequency Above 1 GHz



4.2.6 EUT OPERATING CONDITIONS

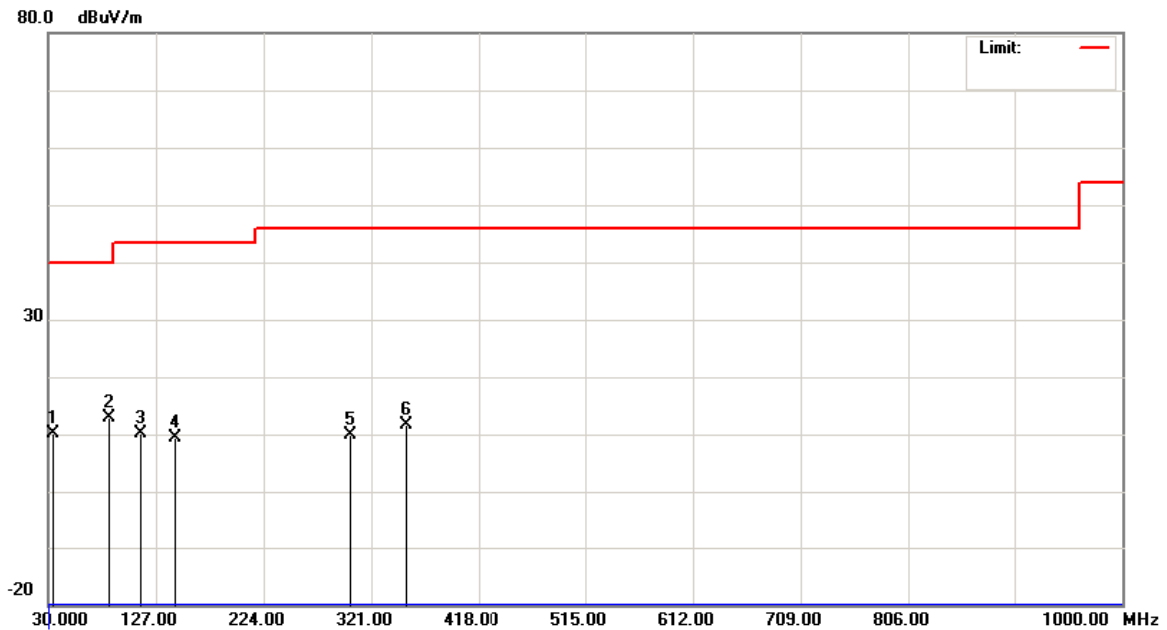
The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.



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

EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	1 Mbps / CH39		

Polarization: Vertical

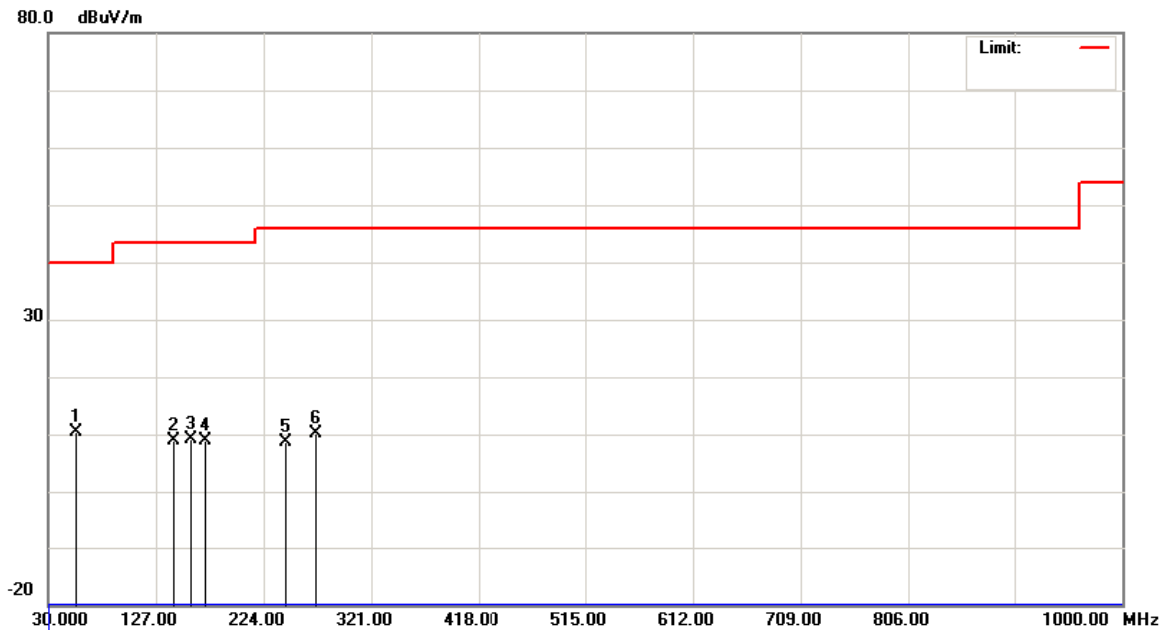


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		33.8800	27.30	-17.22	10.08	40.00	-29.92	peak	
2	*	84.3200	34.34	-21.50	12.84	40.00	-27.16	peak	
3		113.4200	29.64	-19.39	10.25	43.50	-33.25	peak	
4		144.4600	26.01	-16.70	9.31	43.50	-34.19	peak	
5		301.6000	25.45	-15.65	9.80	46.00	-36.20	peak	
6		352.0400	25.88	-14.36	11.52	46.00	-34.48	peak	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	1 Mbps / CH39		

Polarization: Horizontal



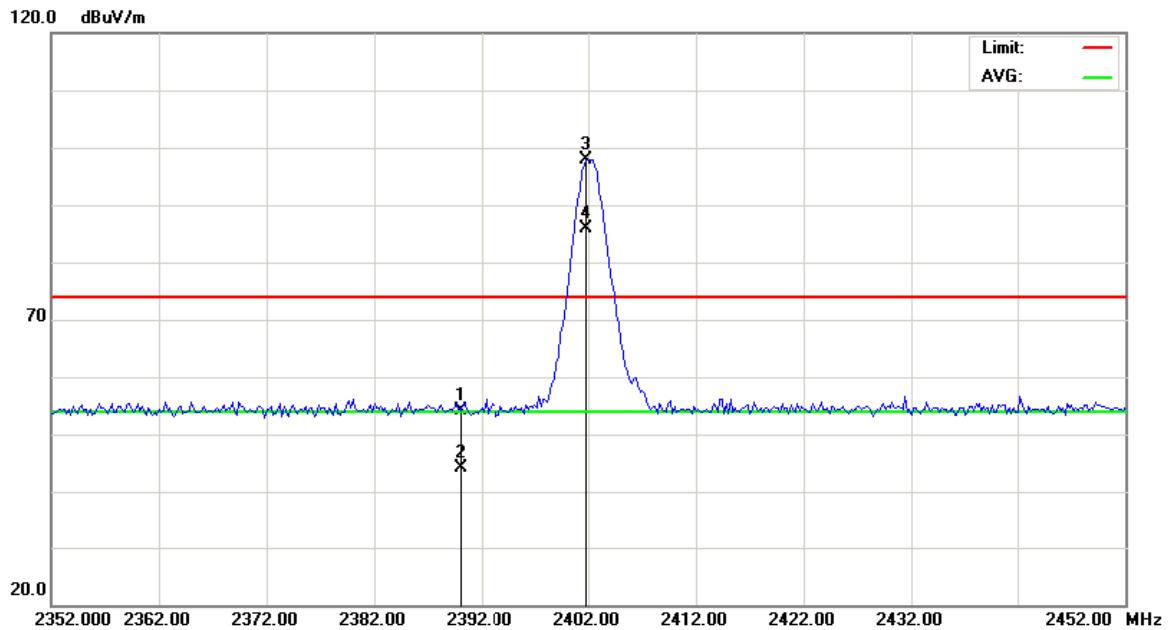
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	55.2200	27.21	-16.94	10.27	40.00	-29.73	peak	
2		142.5200	25.56	-16.77	8.79	43.50	-34.71	peak	
3		158.0399	25.68	-16.59	9.09	43.50	-34.41	peak	
4		171.6200	26.09	-17.26	8.83	43.50	-34.67	peak	
5		243.4000	26.25	-17.51	8.74	46.00	-37.26	peak	
6		270.5600	26.62	-16.57	10.05	46.00	-35.95	peak	



4.2.8 TEST RESULTS - ABOVE 1000MHZ - TX

EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH00		

Polarization: Vertical

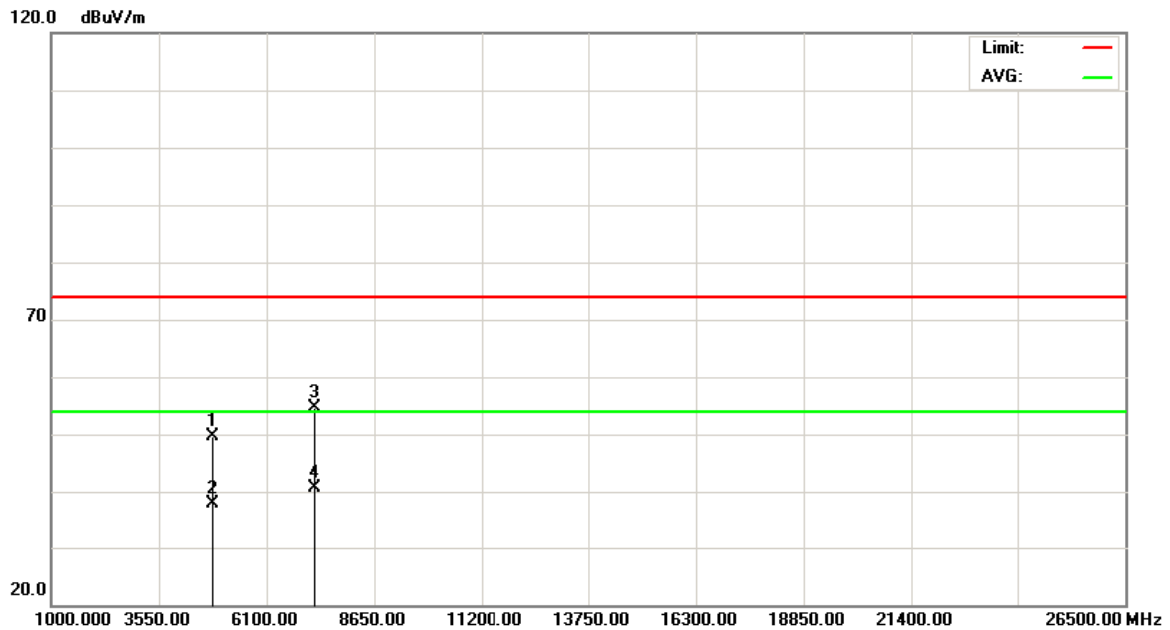


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	21.59	32.59	54.18	74.00	-19.82	peak	
2		2390.000	11.43	32.59	44.02	54.00	-9.98	AVG	
3	X	2401.800	65.16	32.64	97.80	74.00	23.80	peak	
4	*	2401.800	53.32	32.64	85.96	54.00	31.96	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH00		

Polarization: Vertical

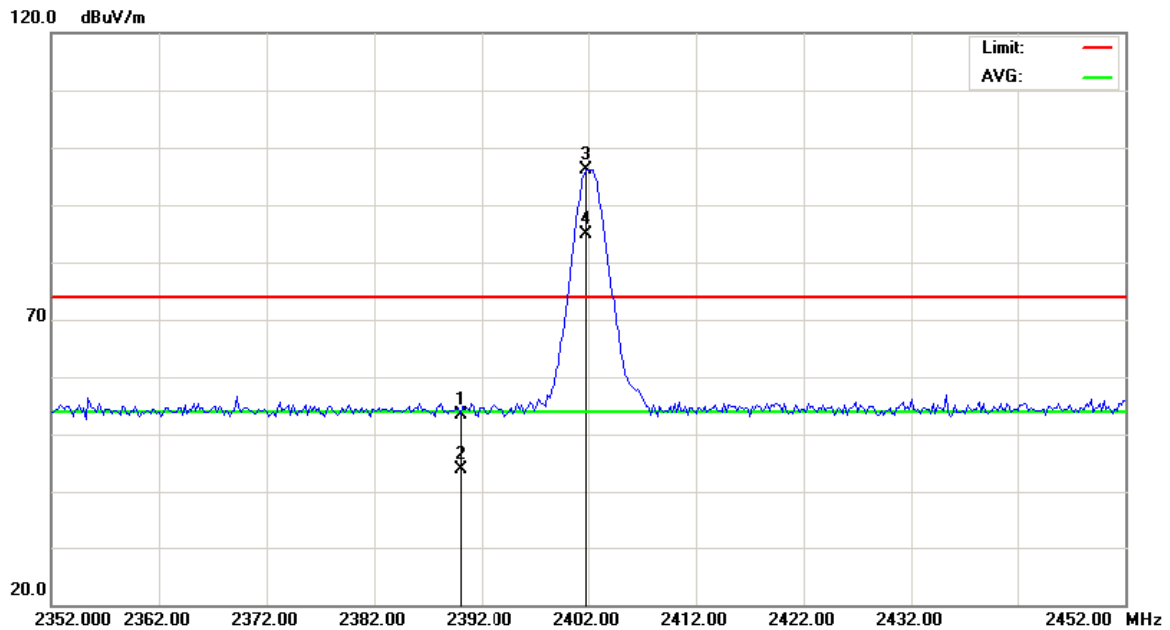


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4803.970	46.05	3.46	49.51	74.00	-24.49	peak	
2		4803.970	34.41	3.46	37.87	54.00	-16.13	AVG	
3		7206.310	44.75	9.95	54.70	74.00	-19.30	peak	
4	*	7206.310	30.66	9.95	40.61	54.00	-13.39	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH00		

Polarization: Horizontal

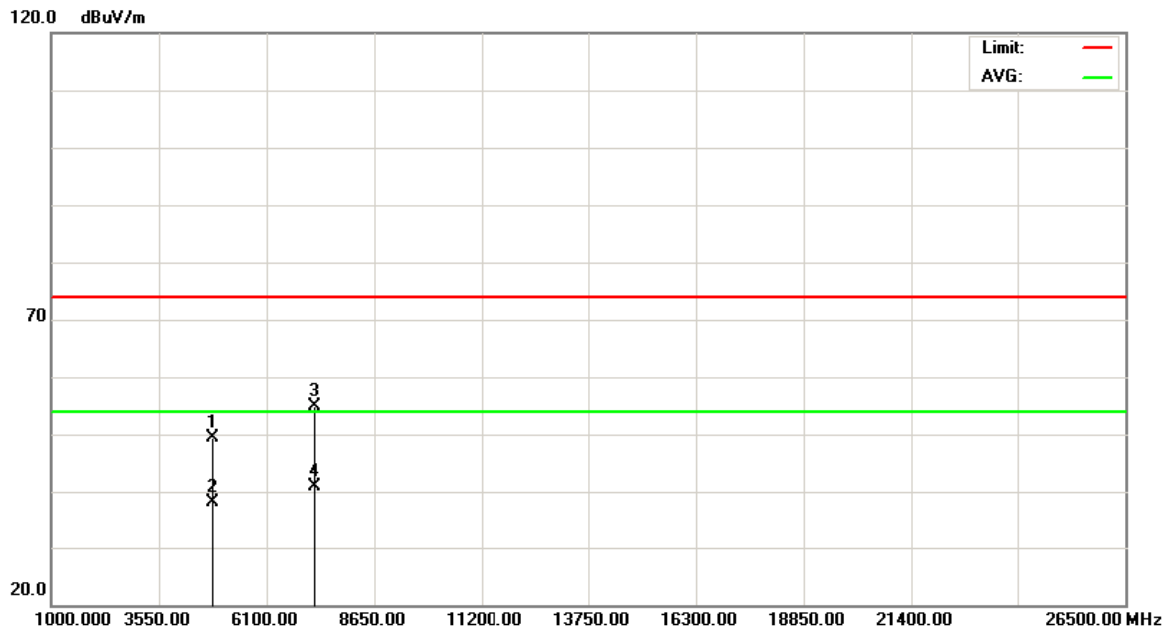


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	20.74	32.59	53.33	74.00	-20.67	peak	
2		2390.000	11.34	32.59	43.93	54.00	-10.07	AVG	
3	X	2401.800	63.58	32.64	96.22	74.00	22.22	peak	
4	*	2401.800	52.14	32.64	84.78	54.00	30.78	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH00		

Polarization: Horizontal

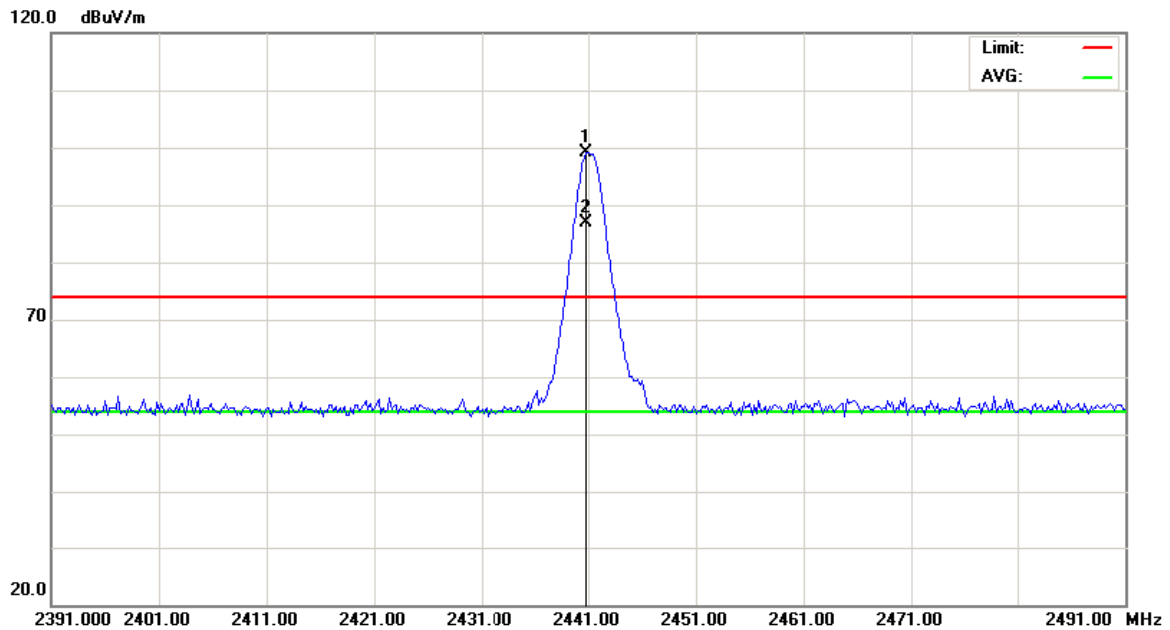


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4803.930	45.90	3.46	49.36	74.00	-24.64	peak	
2		4803.930	34.70	3.46	38.16	54.00	-15.84	AVG	
3		7206.170	44.98	9.95	54.93	74.00	-19.07	peak	
4	*	7206.170	30.82	9.95	40.77	54.00	-13.23	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH39		

Polarization: Vertical

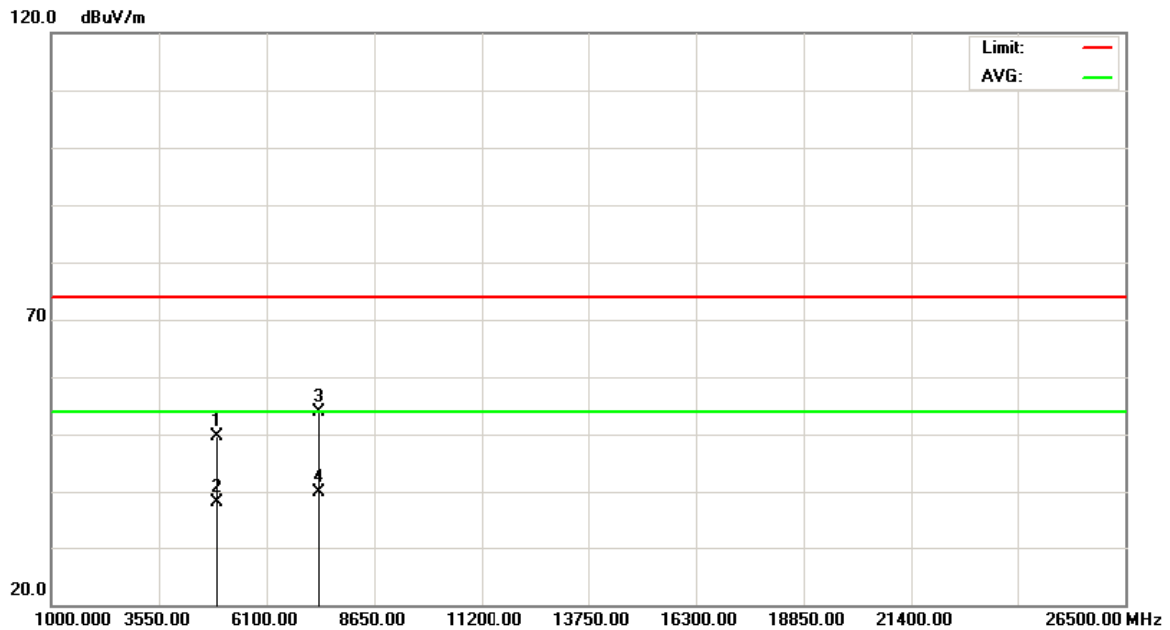


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2440.800	66.23	32.81	99.04	74.00	25.04	peak	
2	*	2440.800	53.97	32.81	86.78	54.00	32.78	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH39		

Polarization: Vertical

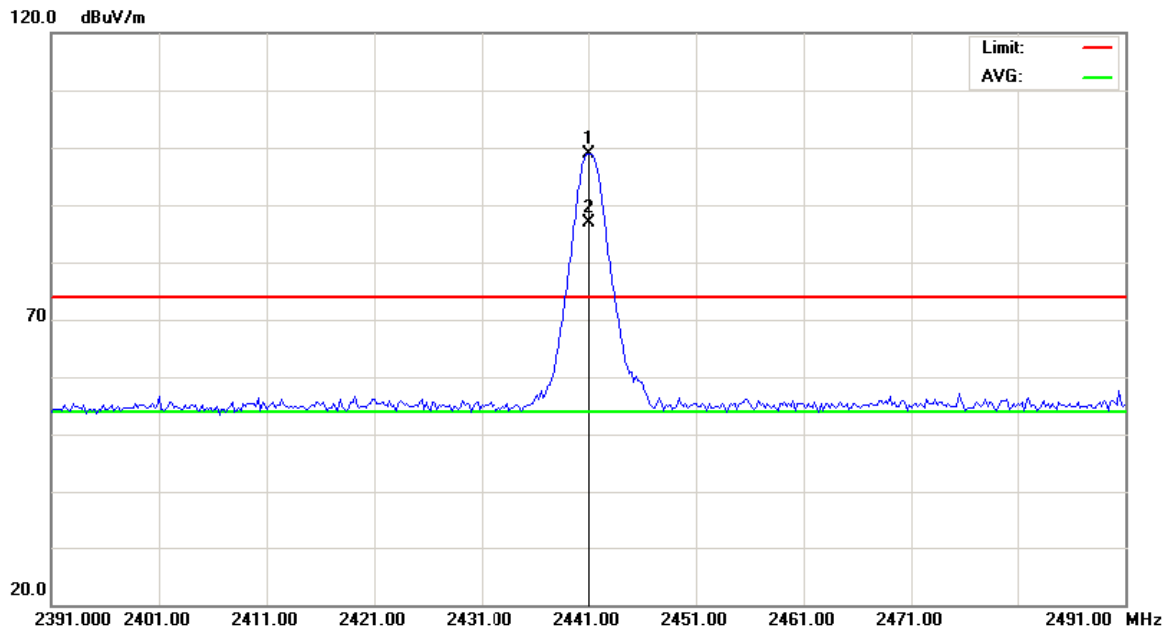


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4881.930	46.09	3.65	49.74	74.00	-24.26	peak	
2		4881.930	34.39	3.65	38.04	54.00	-15.96	AVG	
3		7322.530	43.79	10.11	53.90	74.00	-20.10	peak	
4	*	7322.530	29.76	10.11	39.87	54.00	-14.13	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH39		

Polarization: Horizontal

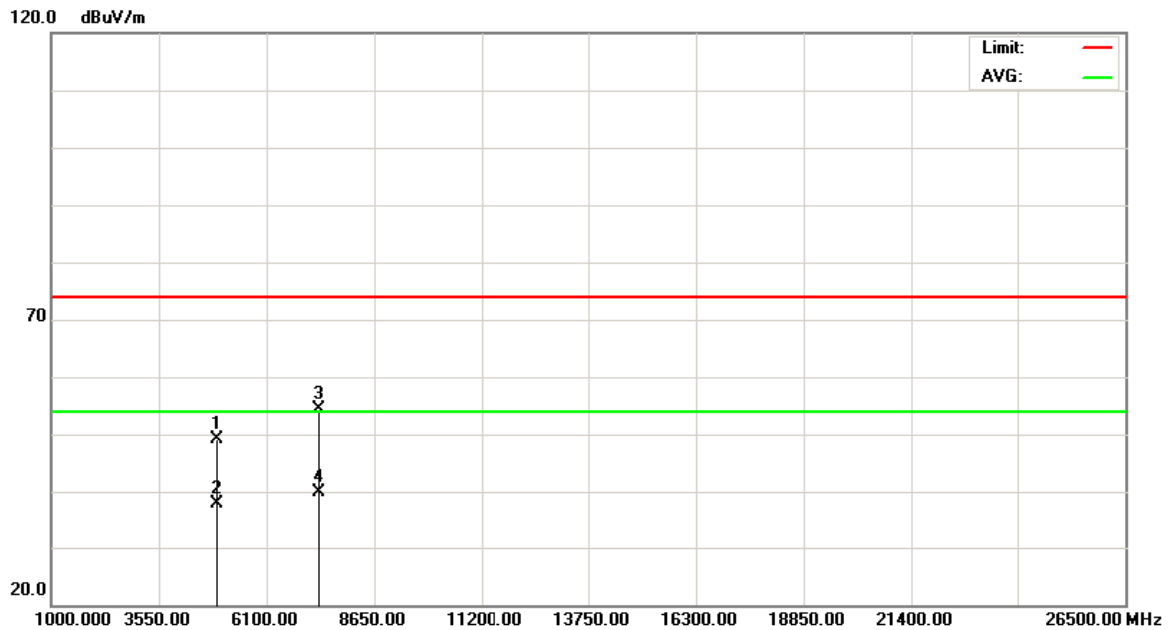


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2441.000	65.97	32.81	98.78	74.00	24.78	peak	
2	*	2441.000	54.08	32.81	86.89	54.00	32.89	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH39		

Polarization: Horizontal

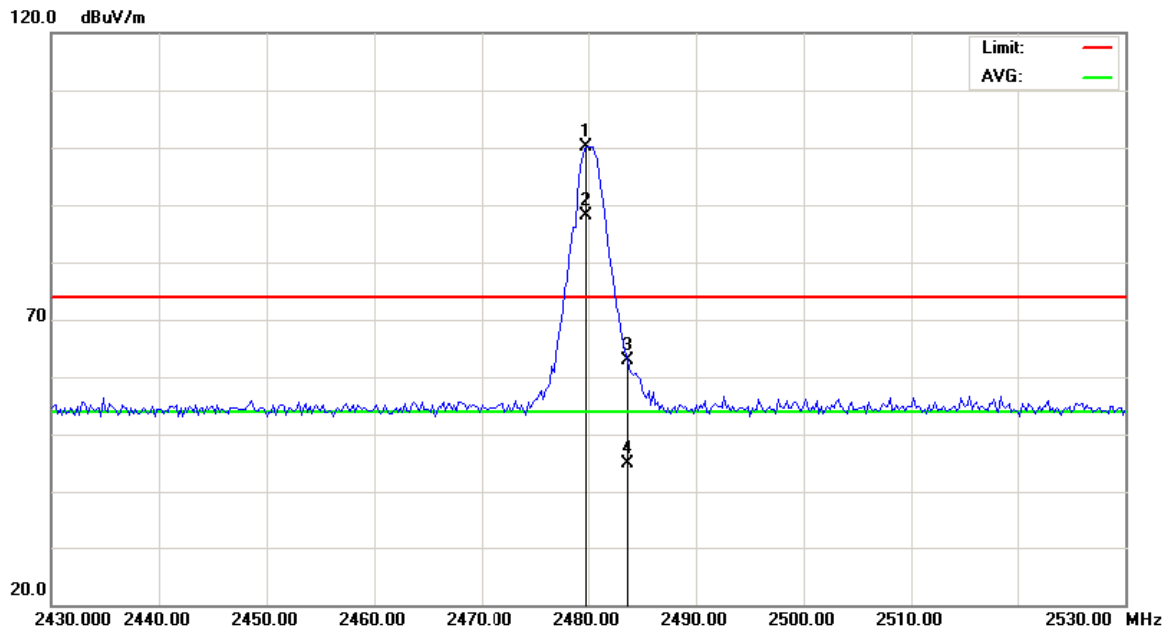


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4881.970	45.46	3.66	49.12	74.00	-24.88	peak	
2		4881.970	34.13	3.66	37.79	54.00	-16.21	AVG	
3		7322.470	44.38	10.11	54.49	74.00	-19.51	peak	
4	*	7322.470	29.78	10.11	39.89	54.00	-14.11	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH78		

Polarization: Vertical

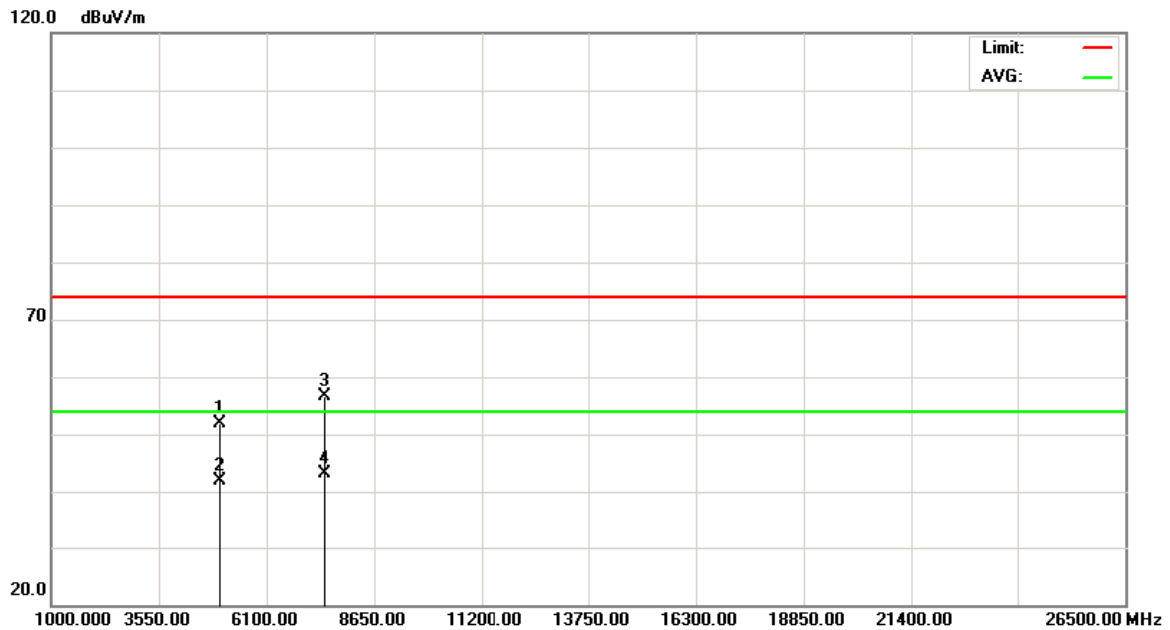


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2479.800	67.23	32.98	100.21	74.00	26.21	peak	
2	*	2479.800	55.16	32.98	88.14	54.00	34.14	AVG	
3		2483.500	29.76	33.00	62.76	74.00	-11.24	peak	
4		2483.500	11.84	33.00	44.84	54.00	-9.16	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH78		

Polarization: Vertical

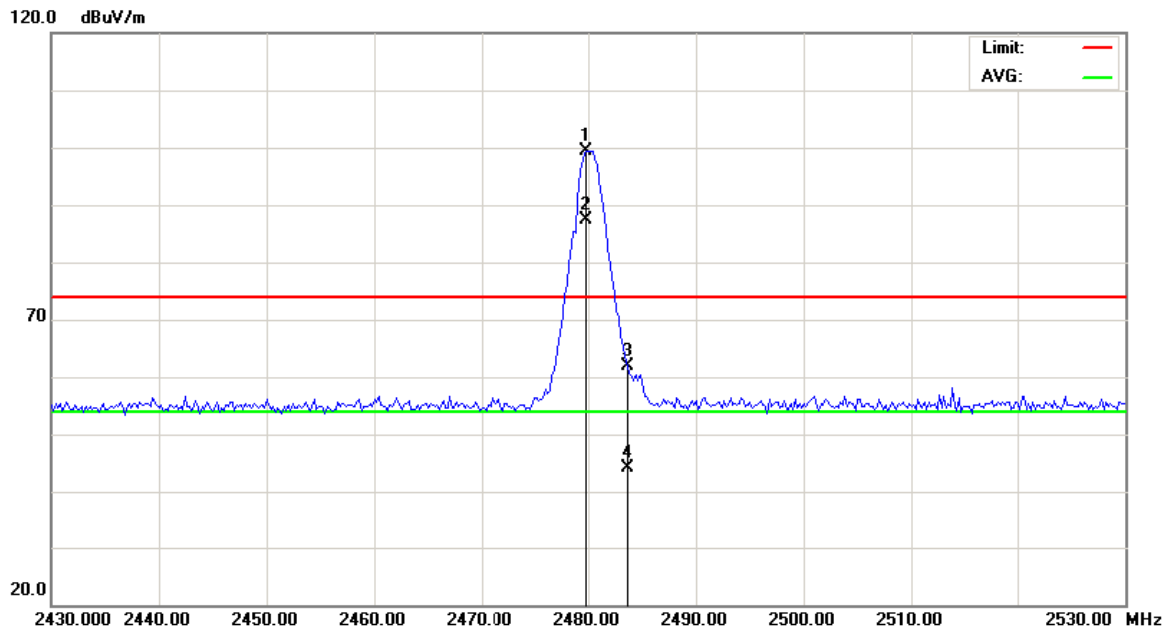


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4959.970	48.13	3.85	51.98	74.00	-22.02	peak	
2		4959.970	38.07	3.85	41.92	54.00	-12.08	AVG	
3		7439.950	46.29	10.27	56.56	74.00	-17.44	peak	
4	*	7439.950	32.92	10.27	43.19	54.00	-10.81	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH78		

Polarization: Horizontal

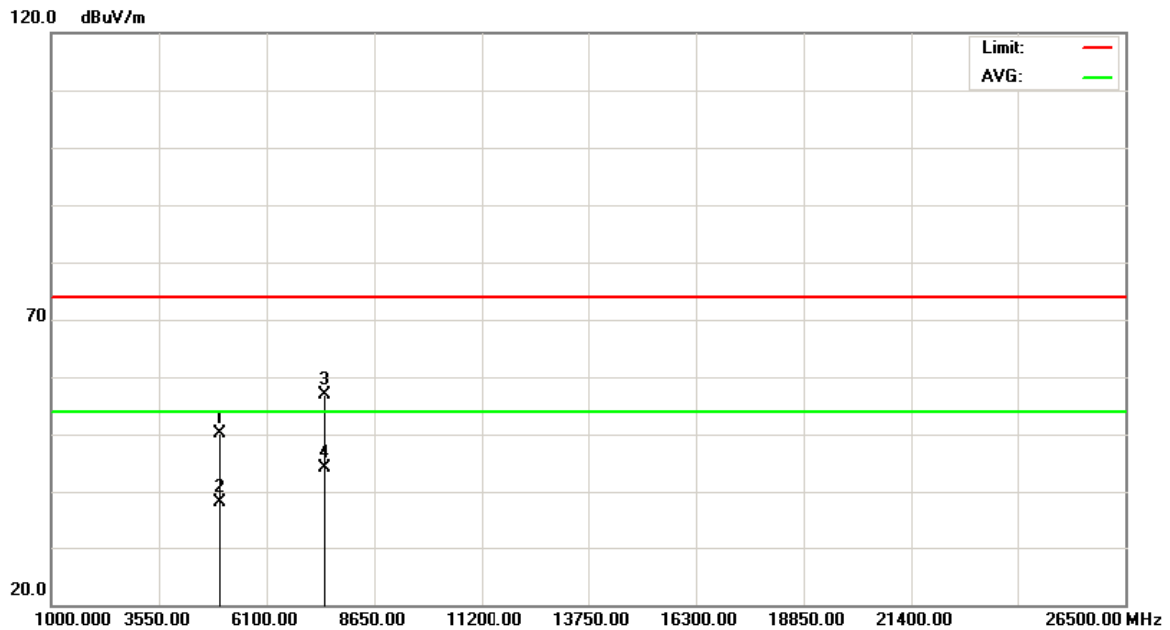


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2479.800	66.41	32.98	99.39	74.00	25.39	peak	
2	*	2479.800	54.52	32.98	87.50	54.00	33.50	AVG	
3		2483.500	28.97	33.00	61.97	74.00	-12.03	peak	
4		2483.500	11.20	33.00	44.20	54.00	-9.80	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	1 Mbps / CH78		

Polarization: Horizontal

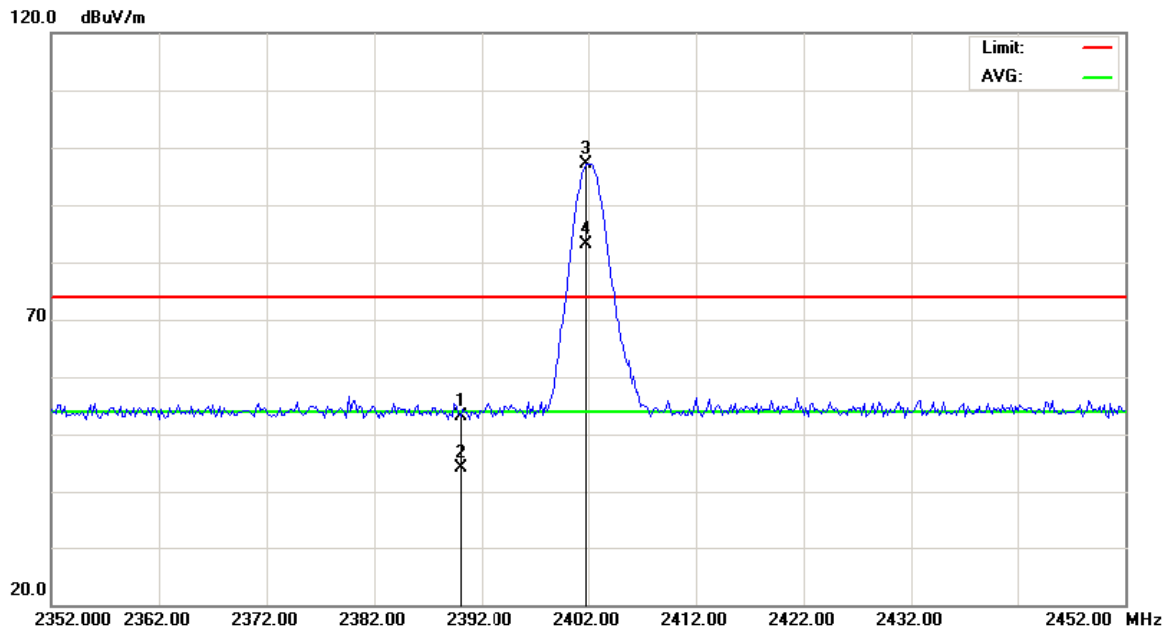


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4959.950	46.18	3.85	50.03	74.00	-23.97	peak	
2		4959.950	34.40	3.85	38.25	54.00	-15.75	AVG	
3		7439.970	46.67	10.27	56.94	74.00	-17.06	peak	
4	*	7439.970	33.95	10.27	44.22	54.00	-9.78	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH00		

Polarization: Vertical

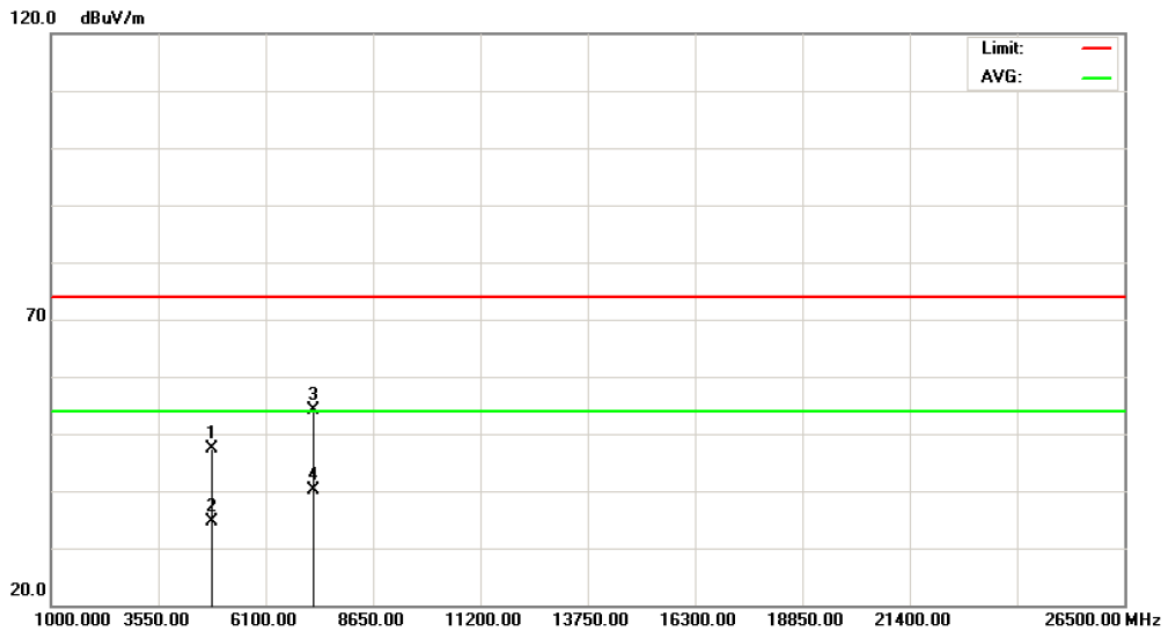


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	20.54	32.59	53.13	74.00	-20.87	peak	
2		2390.000	11.42	32.59	44.01	54.00	-9.99	AVG	
3	X	2401.800	64.54	32.64	97.18	74.00	23.18	peak	
4	*	2401.800	50.56	32.64	83.20	54.00	29.20	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH00		

Polarization: Vertical

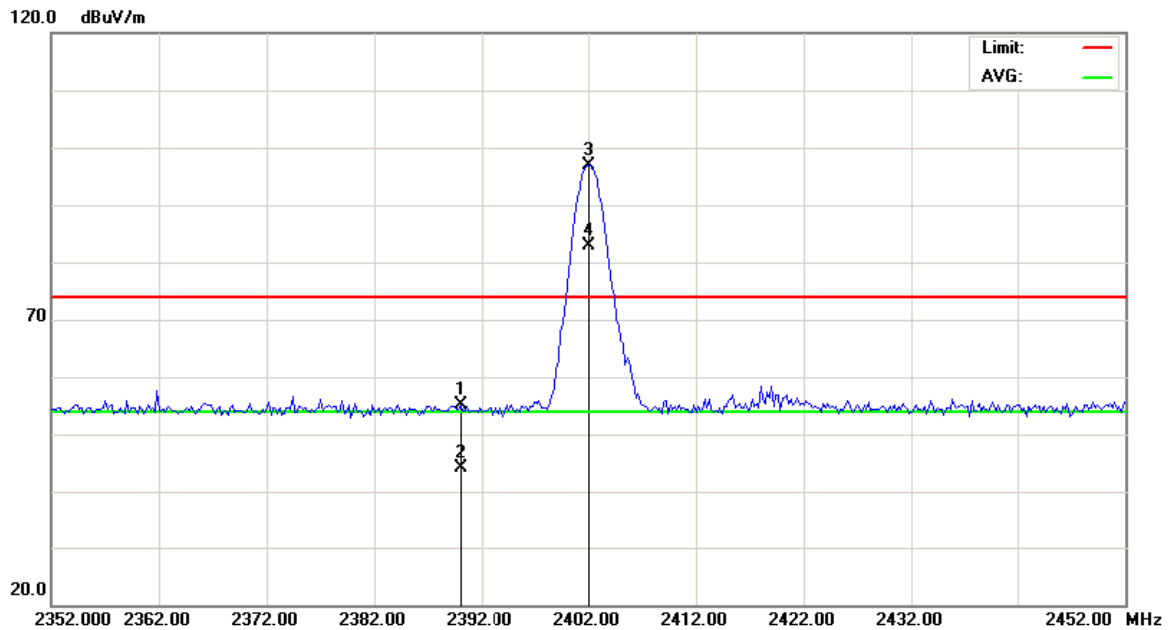


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.010	43.93	3.46	47.39	74.00	-26.61	peak	
2		4804.010	31.10	3.46	34.56	54.00	-19.44	AVG	
3		7206.370	44.29	9.95	54.24	74.00	-19.76	peak	
4	*	7206.370	30.10	9.95	40.05	54.00	-13.95	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH00		

Polarization: Horizontal

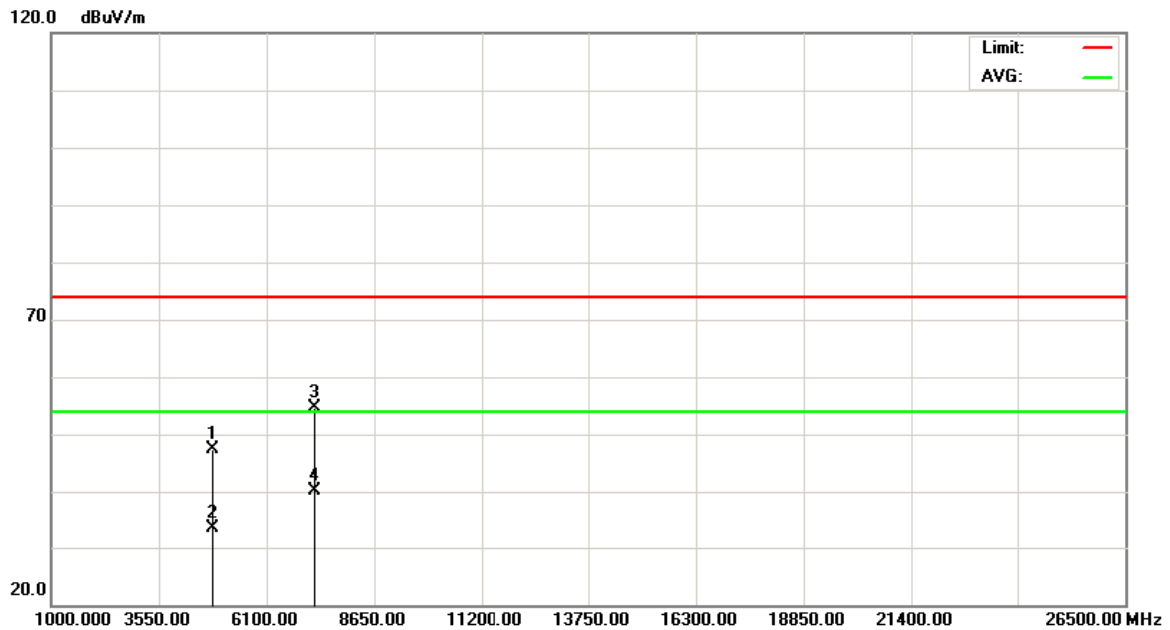


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	22.43	32.59	55.02	74.00	-18.98	peak	
2		2390.000	11.43	32.59	44.02	54.00	-9.98	AVG	
3	X	2402.000	64.30	32.64	96.94	74.00	22.94	peak	
4	*	2402.000	50.27	32.64	82.91	54.00	28.91	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH00		

Polarization: Horizontal

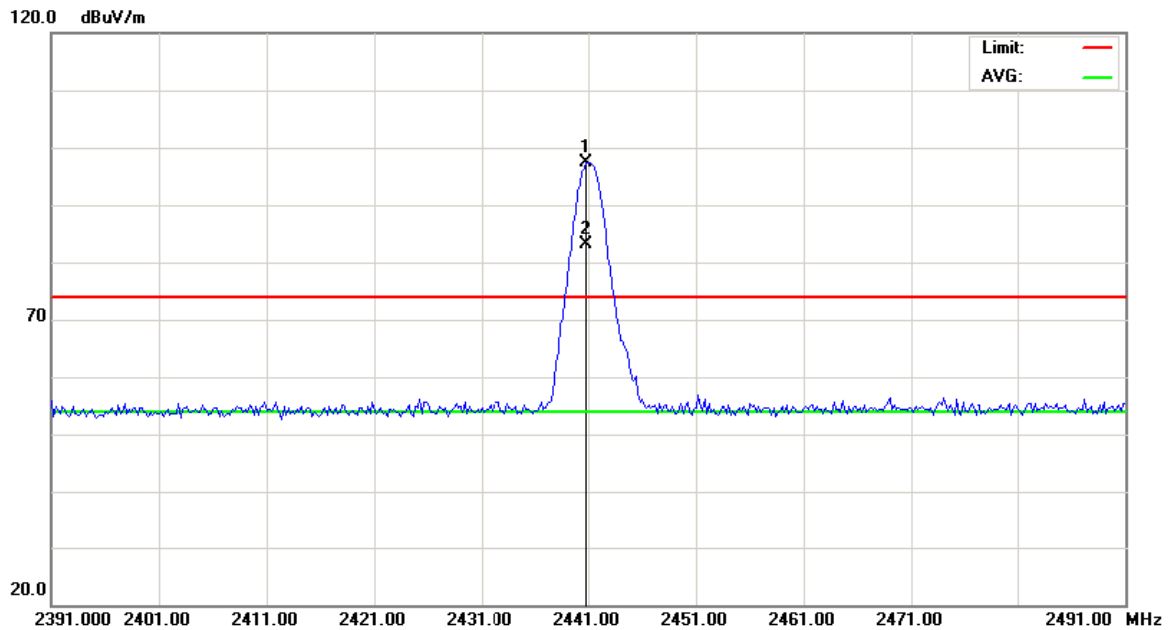


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.170	44.02	3.46	47.48	74.00	-26.52	peak	
2		4804.170	30.19	3.46	33.65	54.00	-20.35	AVG	
3		7206.570	44.59	9.95	54.54	74.00	-19.46	peak	
4	*	7206.570	30.08	9.95	40.03	54.00	-13.97	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH39		

Polarization: Vertical

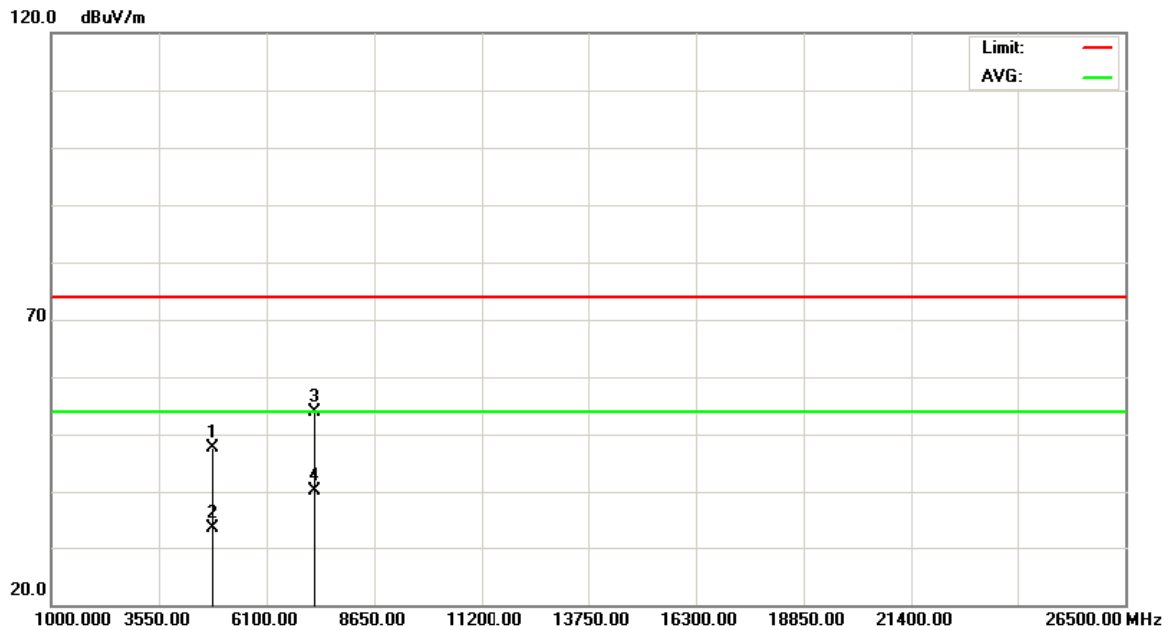


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2440.800	64.55	32.81	97.36	74.00	23.36	peak	
2	*	2440.800	50.39	32.81	83.20	54.00	29.20	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH39		

Polarization: Vertical

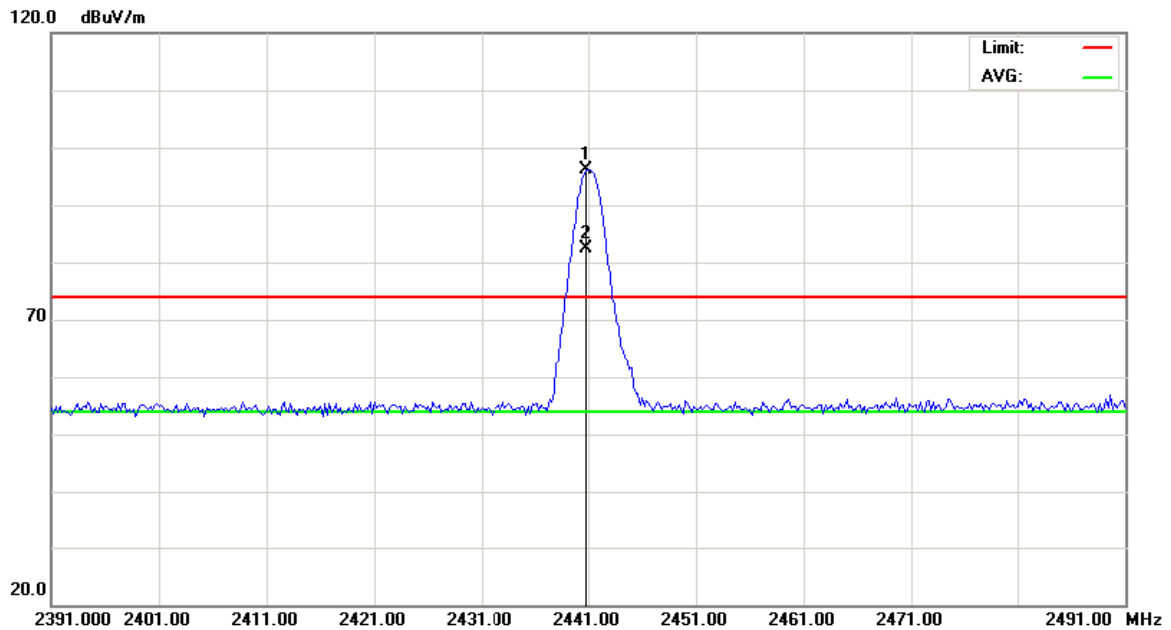


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4805.060	44.25	3.46	47.71	74.00	-26.29	peak	
2		4805.060	30.06	3.46	33.52	54.00	-20.48	AVG	
3		7206.910	43.82	9.95	53.77	74.00	-20.23	peak	
4	*	7206.910	30.27	9.95	40.22	54.00	-13.78	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH39		

Polarization: Horizontal

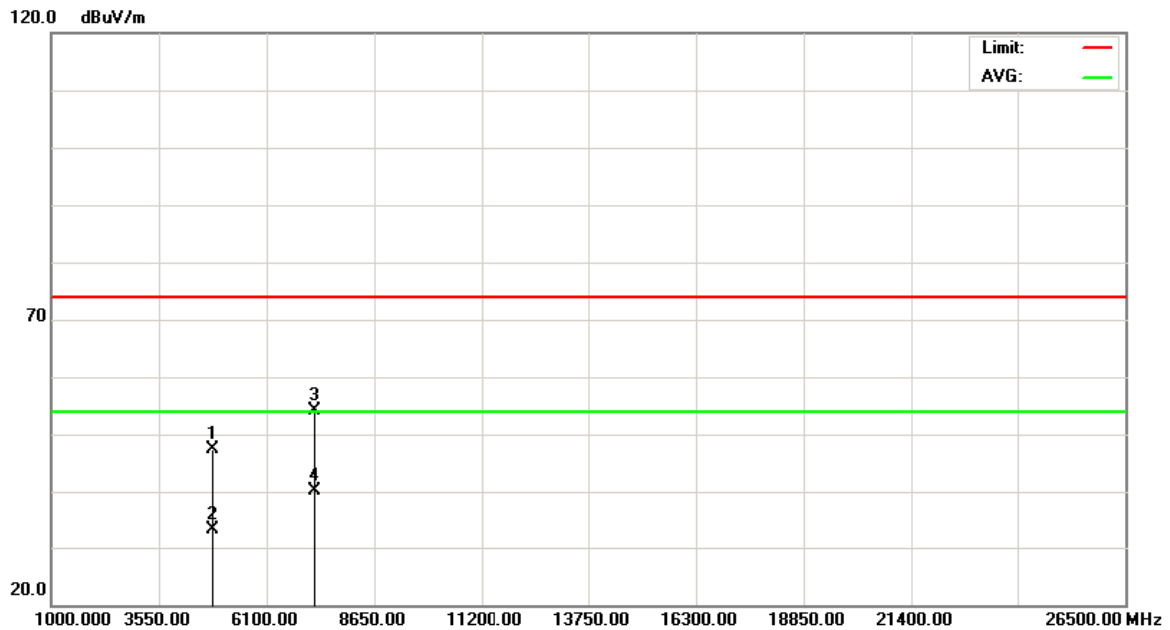


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2440.800	63.38	32.81	96.19	74.00	22.19	peak	
2	*	2440.800	49.64	32.81	82.45	54.00	28.45	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH39		

Polarization: Horizontal

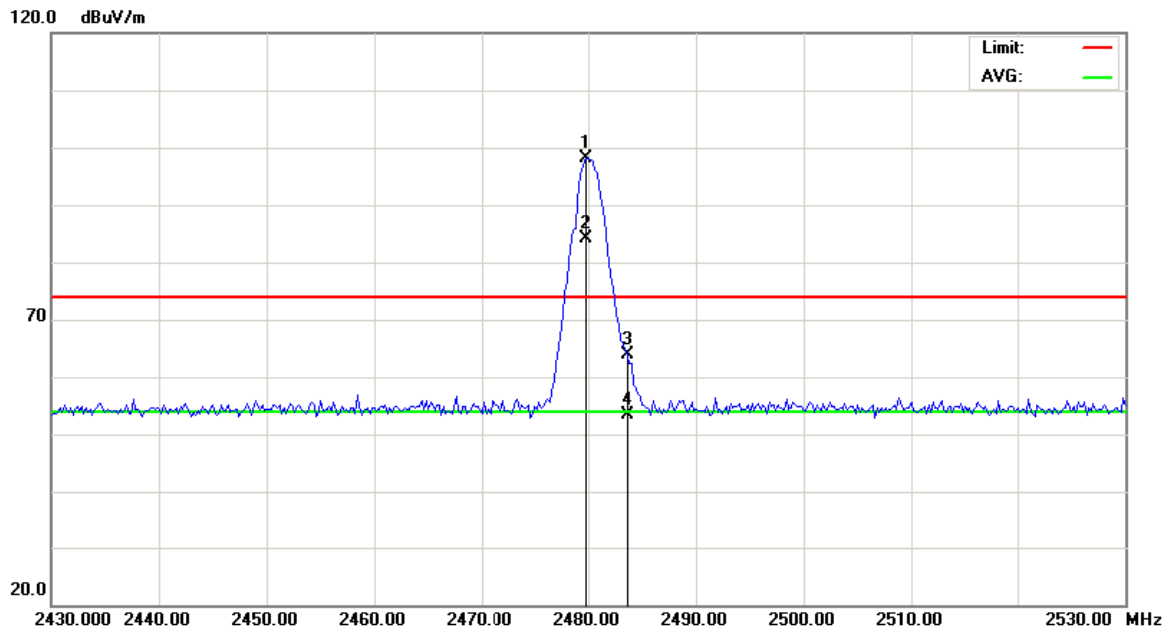


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.580	43.99	3.46	47.45	74.00	-26.55	peak	
2		4804.580	29.94	3.46	33.40	54.00	-20.60	AVG	
3		7206.790	44.30	9.95	54.25	74.00	-19.75	peak	
4	*	7206.790	30.24	9.95	40.19	54.00	-13.81	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH78		

Polarization: Vertical

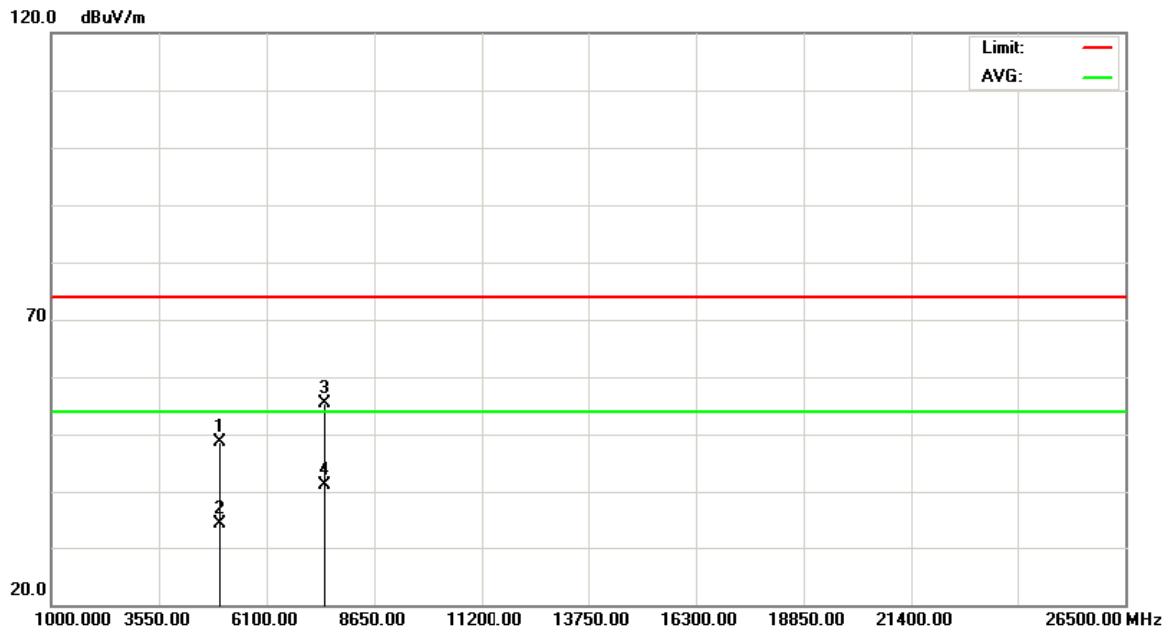


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2479.800	65.19	32.98	98.17	74.00	24.17	peak	
2	*	2479.800	51.22	32.98	84.20	54.00	30.20	AVG	
3		2483.500	30.88	33.00	63.88	74.00	-10.12	peak	
4		2483.500	20.34	33.00	53.34	54.00	-0.66	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH78		

Polarization: Vertical

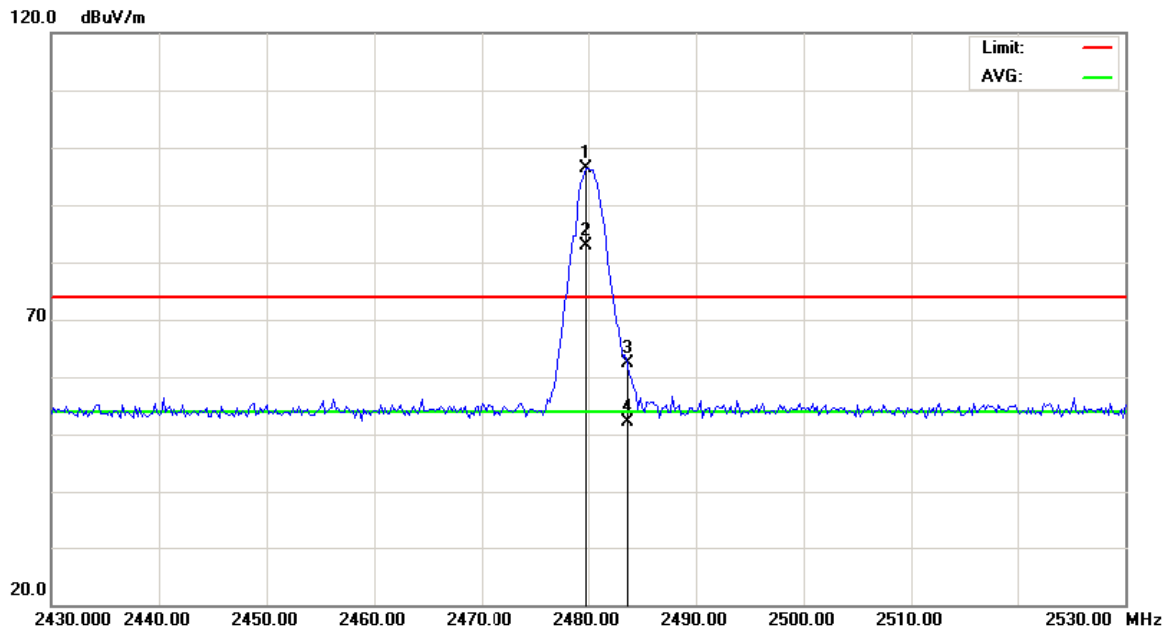


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4960.110	44.73	3.85	48.58	74.00	-25.42	peak	
2		4960.110	30.56	3.85	34.41	54.00	-19.59	AVG	
3		7439.870	45.12	10.27	55.39	74.00	-18.61	peak	
4	*	7439.870	30.82	10.27	41.09	54.00	-12.91	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH78		

Polarization: Horizontal

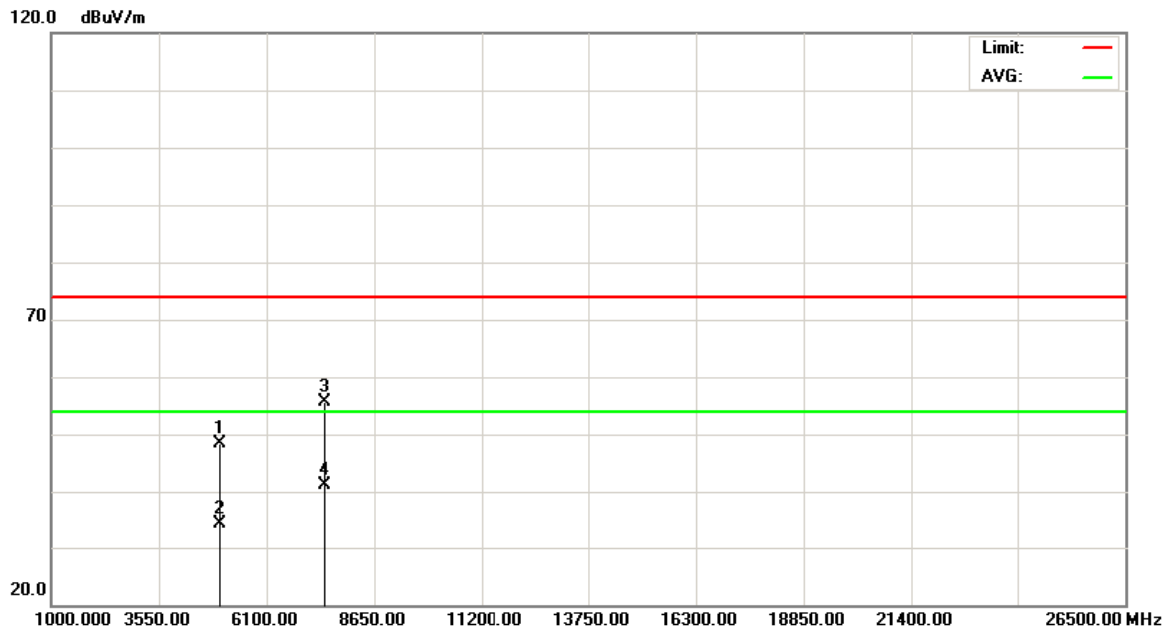


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2479.800	63.37	32.98	96.35	74.00	22.35	peak	
2	*	2479.800	49.85	32.98	82.83	54.00	28.83	AVG	
3		2483.500	29.38	33.00	62.38	74.00	-11.62	peak	
4		2483.500	19.18	33.00	52.18	54.00	-1.82	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	3 Mbps / CH78		

Polarization: Horizontal



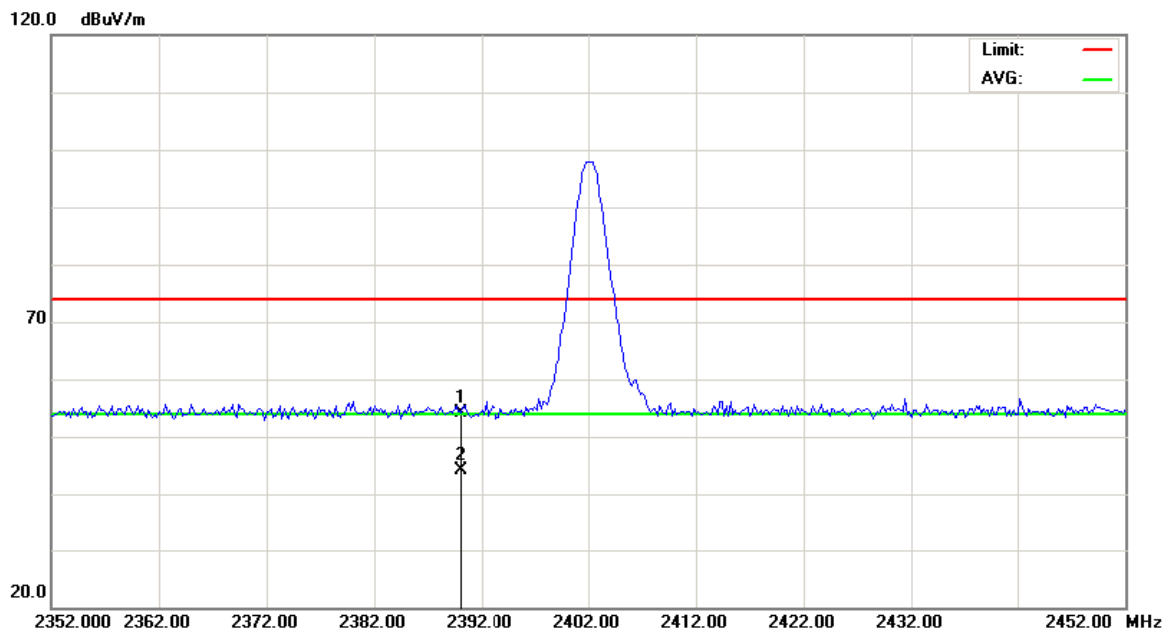
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4959.870	44.49	3.85	48.34	74.00	-25.66	peak	
2		4960.490	30.44	3.85	34.29	54.00	-19.71	AVG	
3		7439.870	45.45	10.27	55.72	74.00	-18.28	peak	
4	*	7439.870	30.77	10.27	41.04	54.00	-12.96	AVG	



4.2.9 TEST RESULTS-Restricted Bands Requirements

EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	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

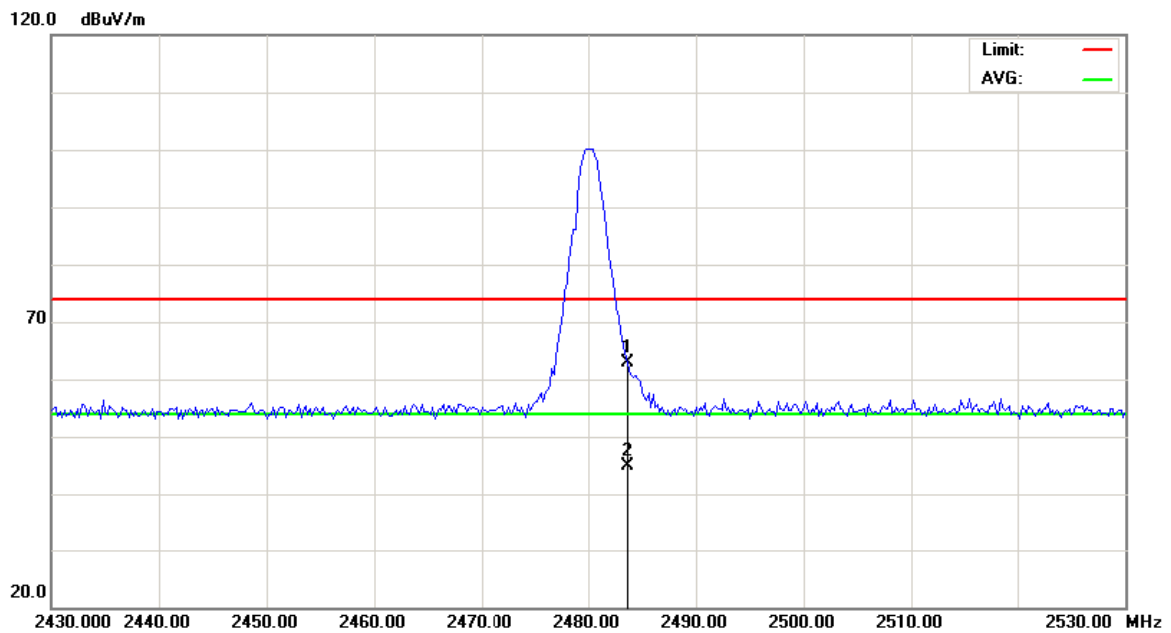


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	21.59	32.59	54.18	74.00	-19.82	peak	
2	*	2390.000	11.43	32.59	44.02	54.00	-9.98	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	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

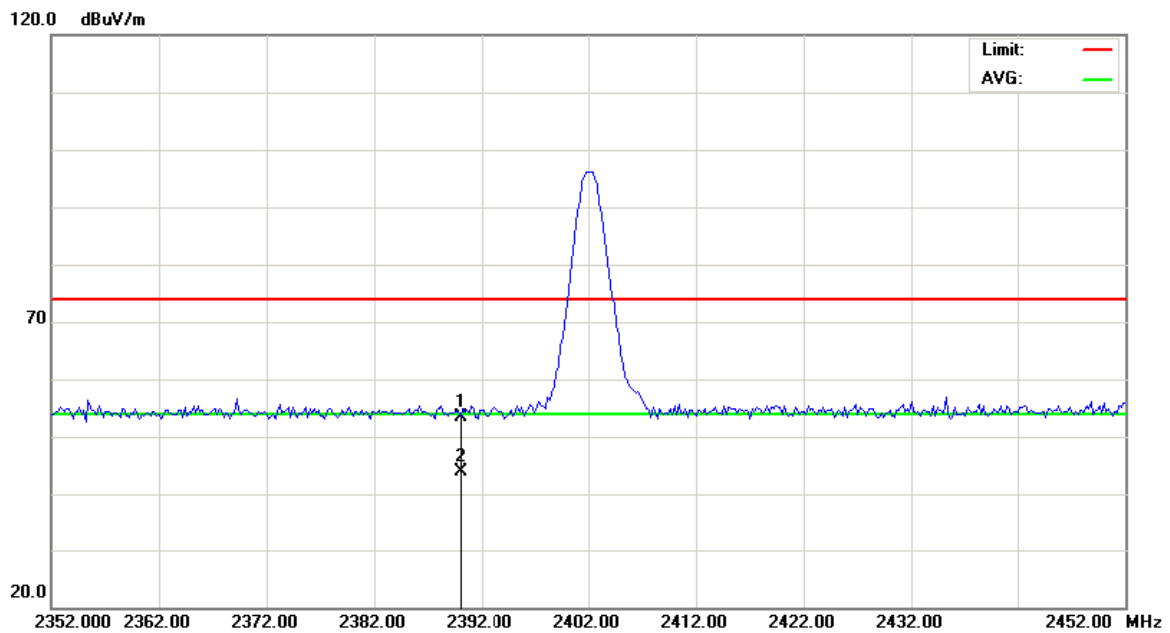


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2483.500	29.76	33.00	62.76	74.00	-11.24	peak	
2	*	2483.500	11.84	33.00	44.84	54.00	-9.16	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	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

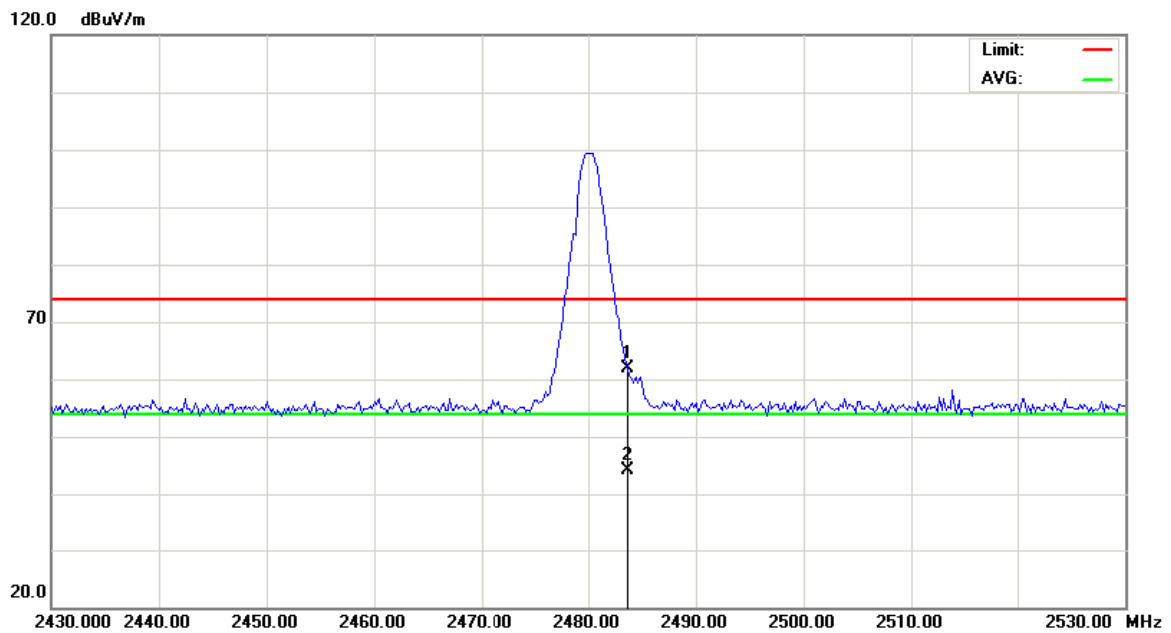


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	20.74	32.59	53.33	74.00	-20.67	peak	
2	*	2390.000	11.34	32.59	43.93	54.00	-10.07	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	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

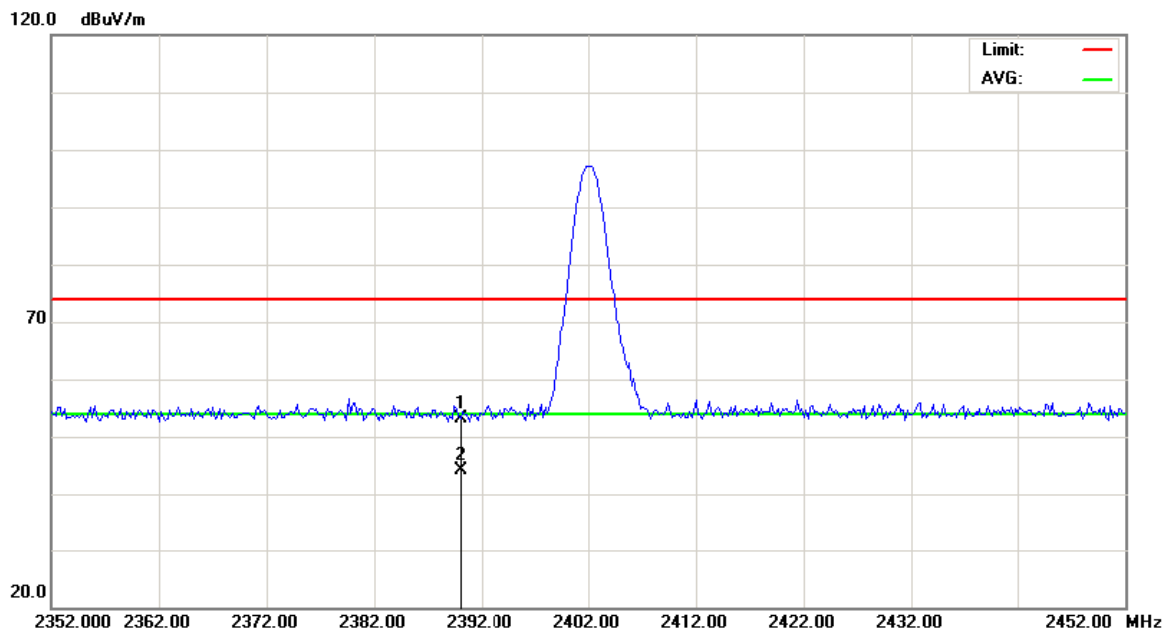


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2483.500	28.97	33.00	61.97	74.00	-12.03	peak	
2	*	2483.500	11.20	33.00	44.20	54.00	-9.80	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	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

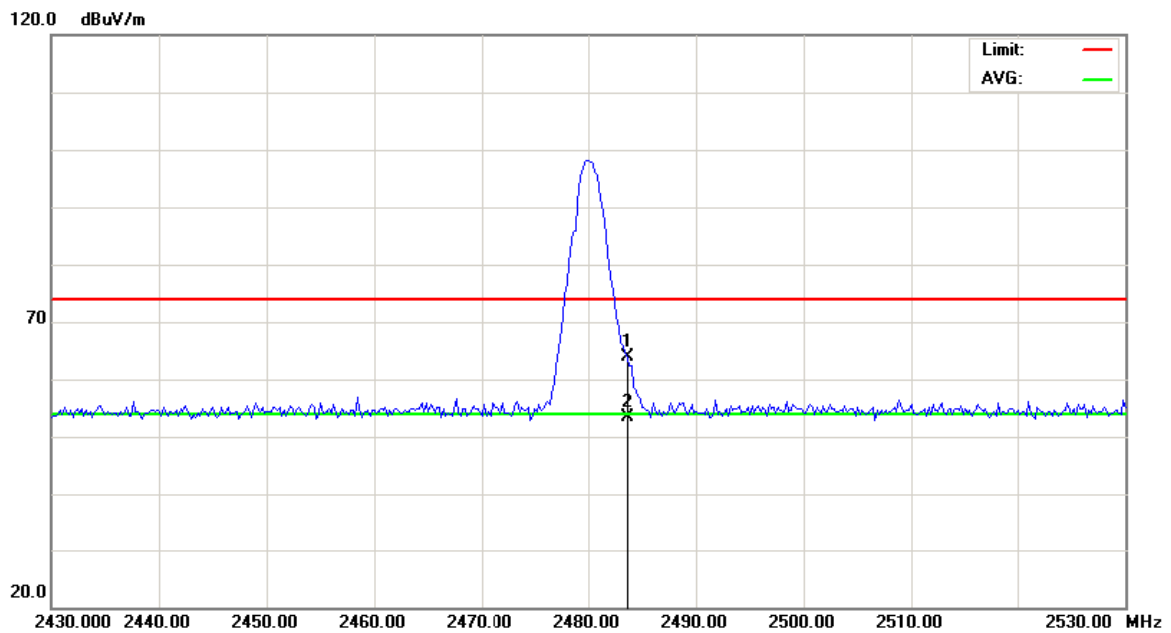


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	20.54	32.59	53.13	74.00	-20.87	peak	
2	*	2390.000	11.42	32.59	44.01	54.00	-9.99	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	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

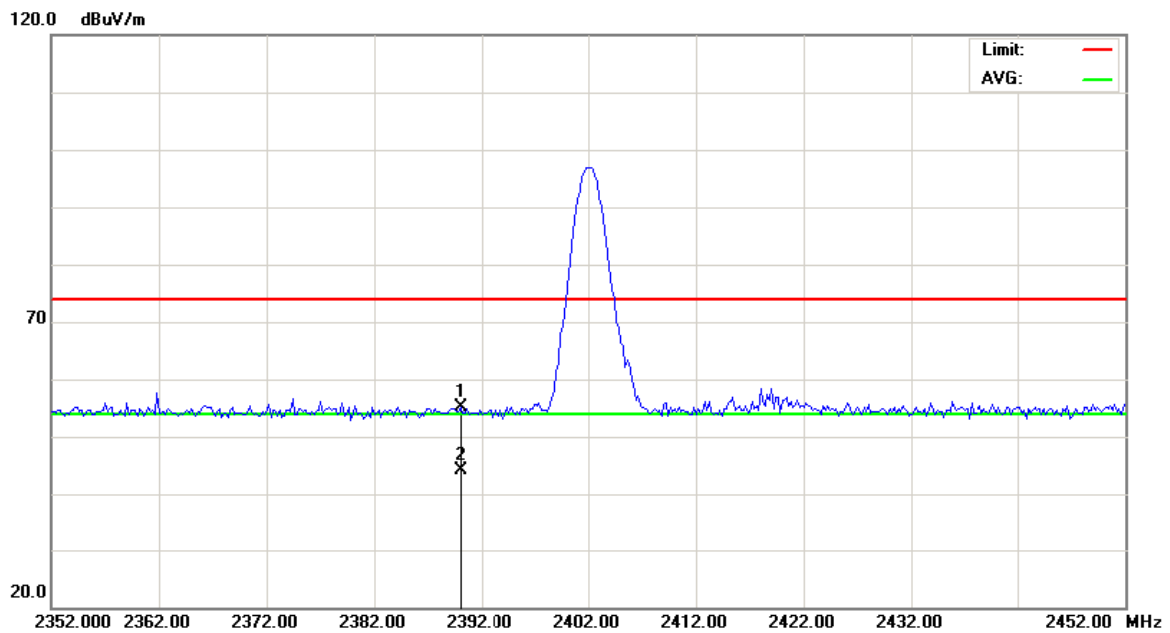


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2483.500	30.88	33.00	63.88	74.00	-10.12	peak	
2	*	2483.500	20.34	33.00	53.34	54.00	-0.66	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	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

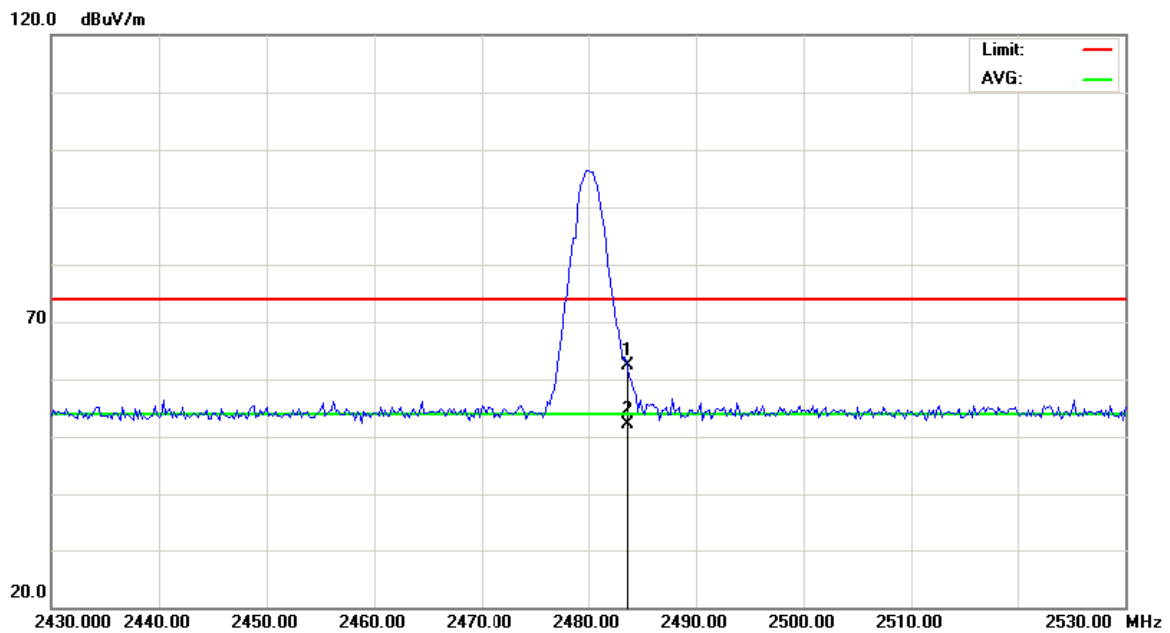


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	22.43	32.59	55.02	74.00	-18.98	peak	
2	*	2390.000	11.43	32.59	44.02	54.00	-9.98	AVG	



EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)	Orthogonal Axes:	Y
Test Mode :	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	29.38	33.00	62.38	74.00	-11.62	peak	
2	*	2483.500	19.18	33.00	52.18	54.00	-1.82	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

5.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Aug. 30, 2012

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

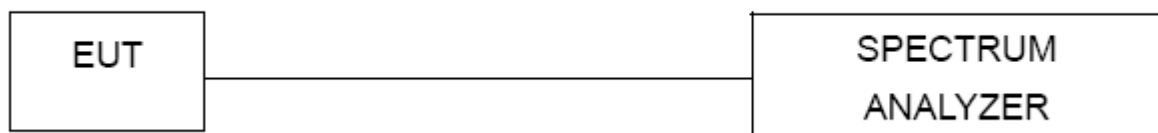
Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.1.2 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.

5.1.3 DEVIATION FROM STANDARD

No deviation.

5.1.4 TEST SETUP**5.1.5 EUT OPERATION CONDITIONS**

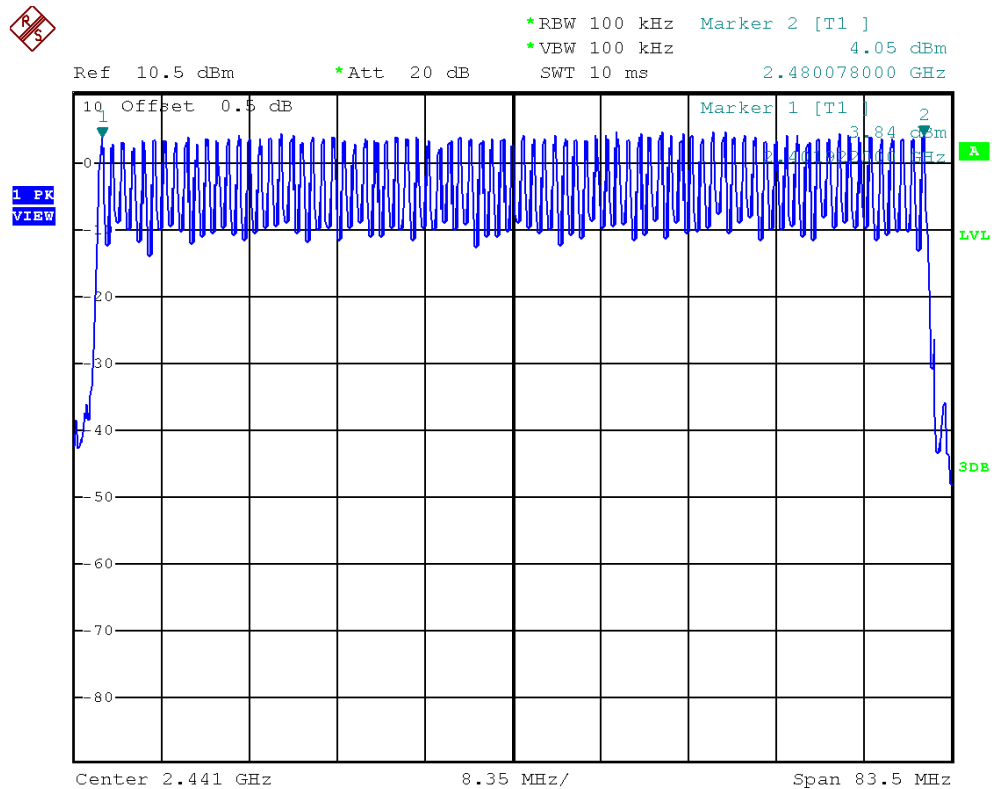
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.



5.1.6 TEST RESULTS

EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	1 Mbps / CH00~CH78		

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





EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	3 Mbps / CH00~CH78		

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



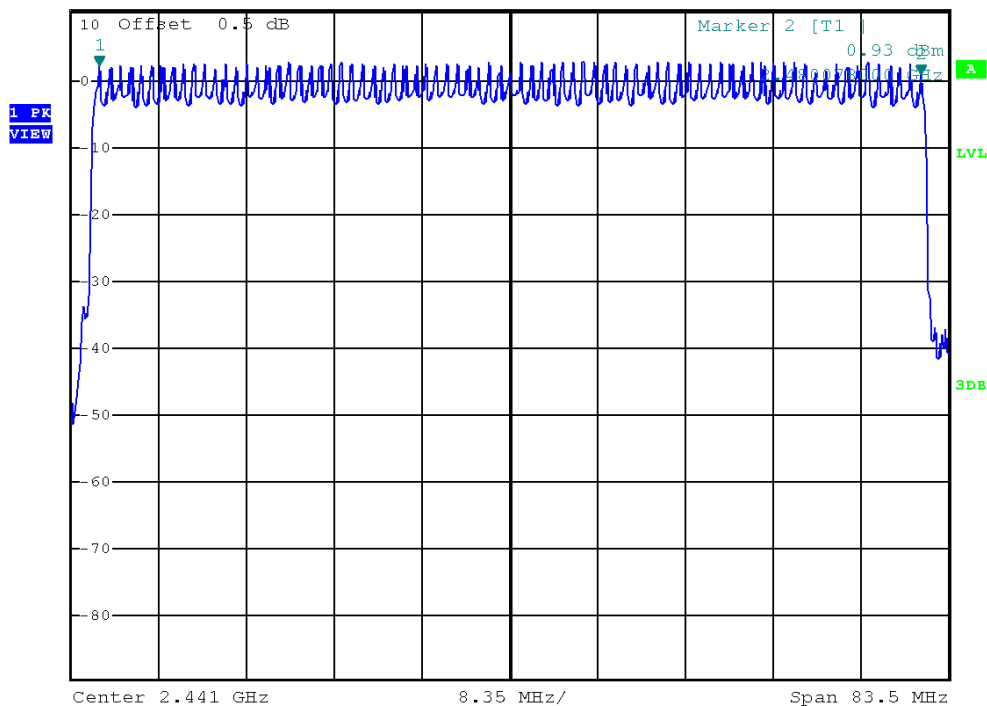
*RBW 100 kHz Marker 1 [T1]
*VBW 100 kHz 2.21 dBm
SWT 10 ms 2.401922000 GHz

Ref 10.5 dBm

*Att 20 dB

SWT 10 ms

2.401922000 GHz



**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

6.1.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Aug. 30, 2012

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

6.1.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyser
- b. Set RBW of spectrum analyzer to 100kHz and VBW to 100kHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. 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.
- j. 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.
- k. 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.

6.1.3 DEVIATION FROM STANDARD

No deviation.



6.1.4 TEST SETUP



6.1.5 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.

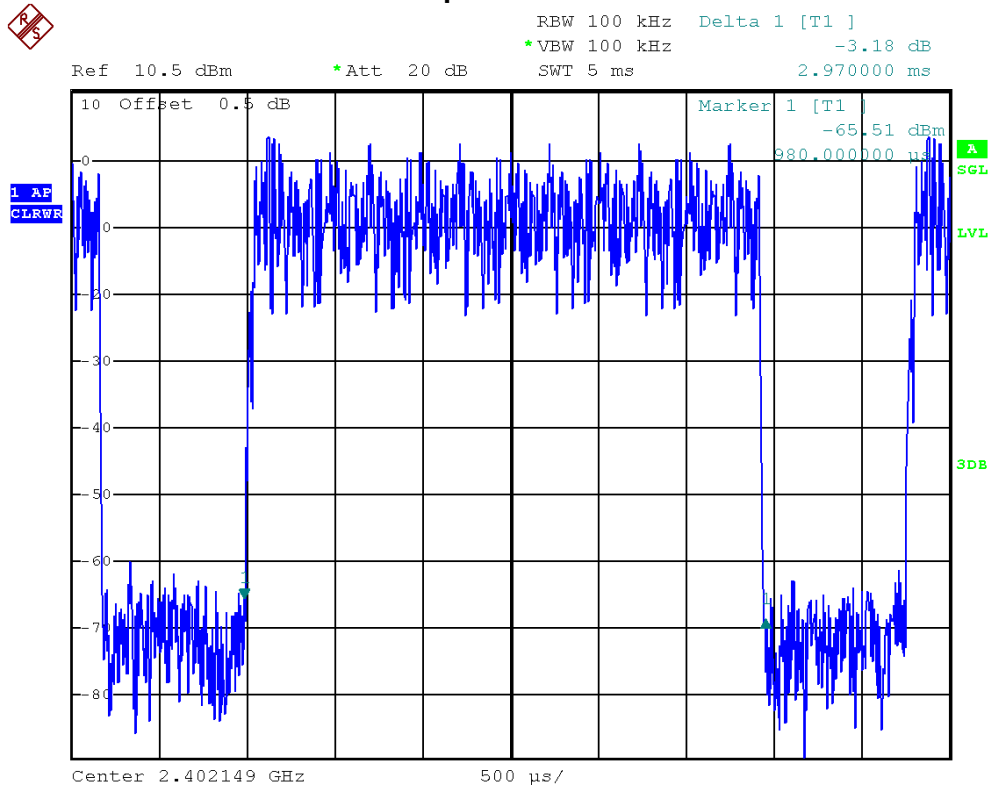


6.1.6 TEST RESULTS

EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	1 Mbps / CH00-DH5/DH3/DH1		

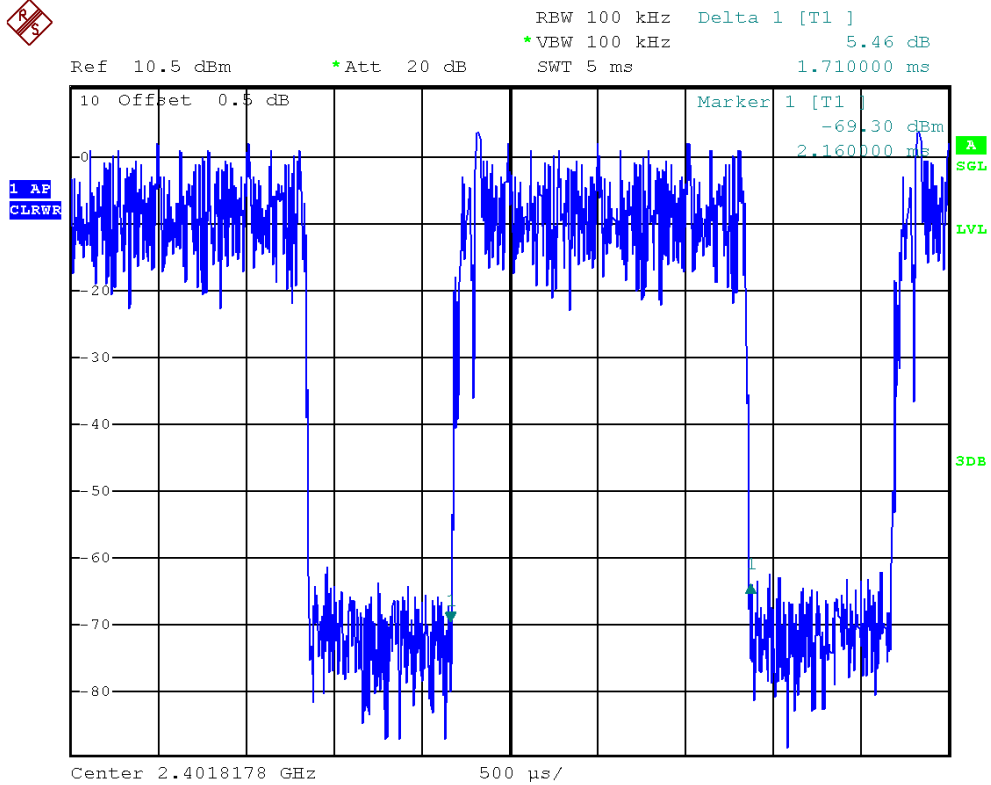
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2402 MHz	2.9700	0.3168	0.4000
DH3	2402 MHz	1.7100	0.2736	0.4000
DH1	2402 MHz	0.4550	0.1456	0.4000

1 Mbps / CH00-DH5

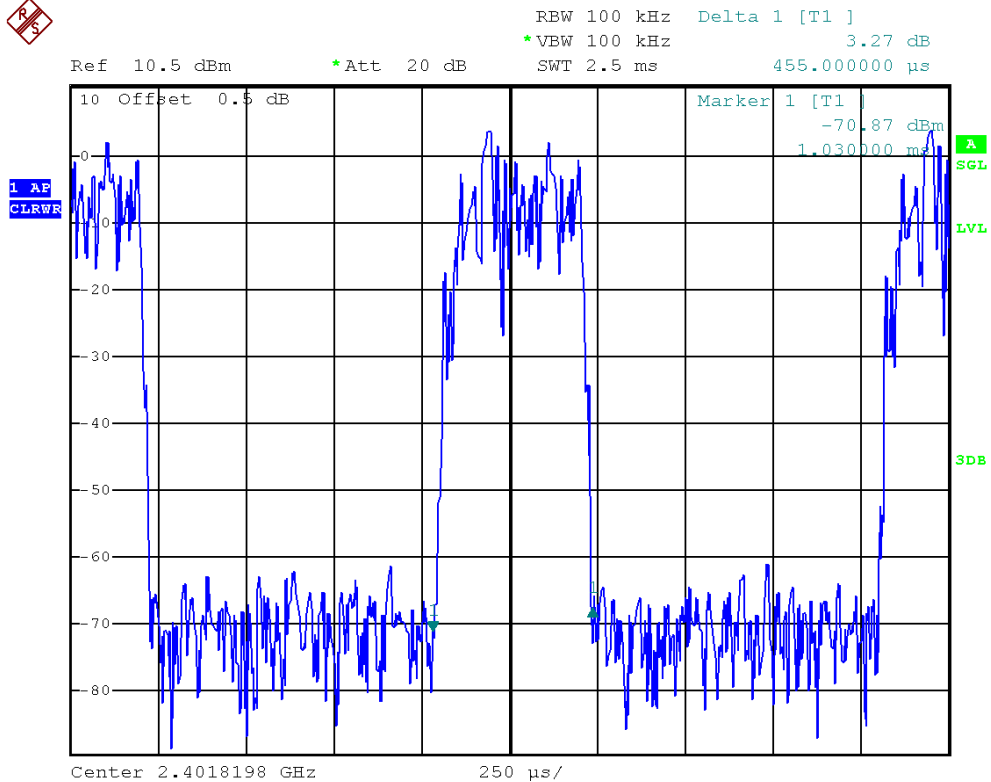




1 Mbps / CH00-DH3



1 Mbps / CH00-DH1

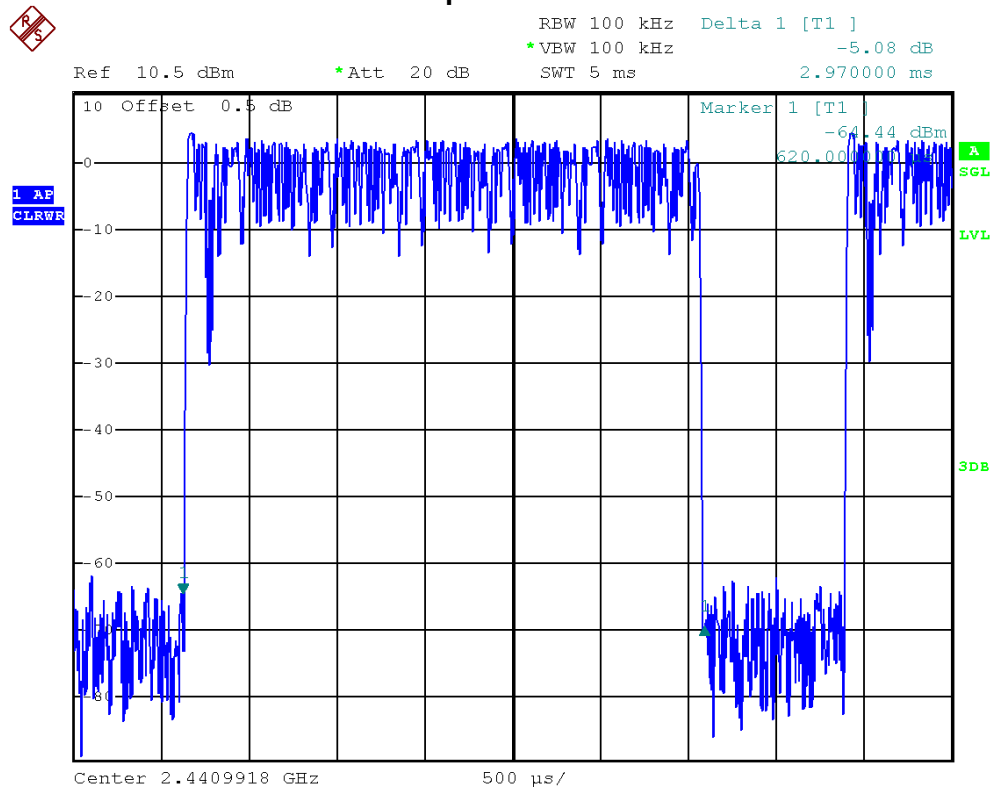




EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	1 Mbps / CH39-DH5/DH3/DH1		

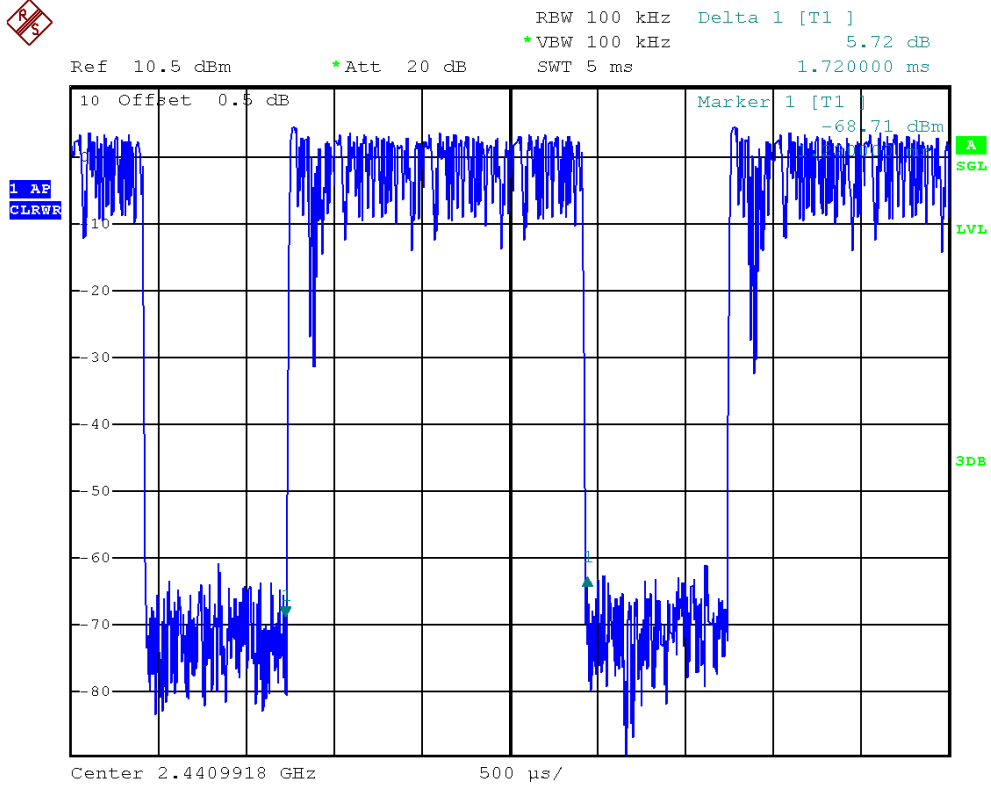
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2441 MHz	2.9700	0.3168	0.4000
DH3	2441 MHz	1.7200	0.2752	0.4000
DH1	2441 MHz	0.4560	0.1459	0.4000

1 Mbps / CH39-DH5

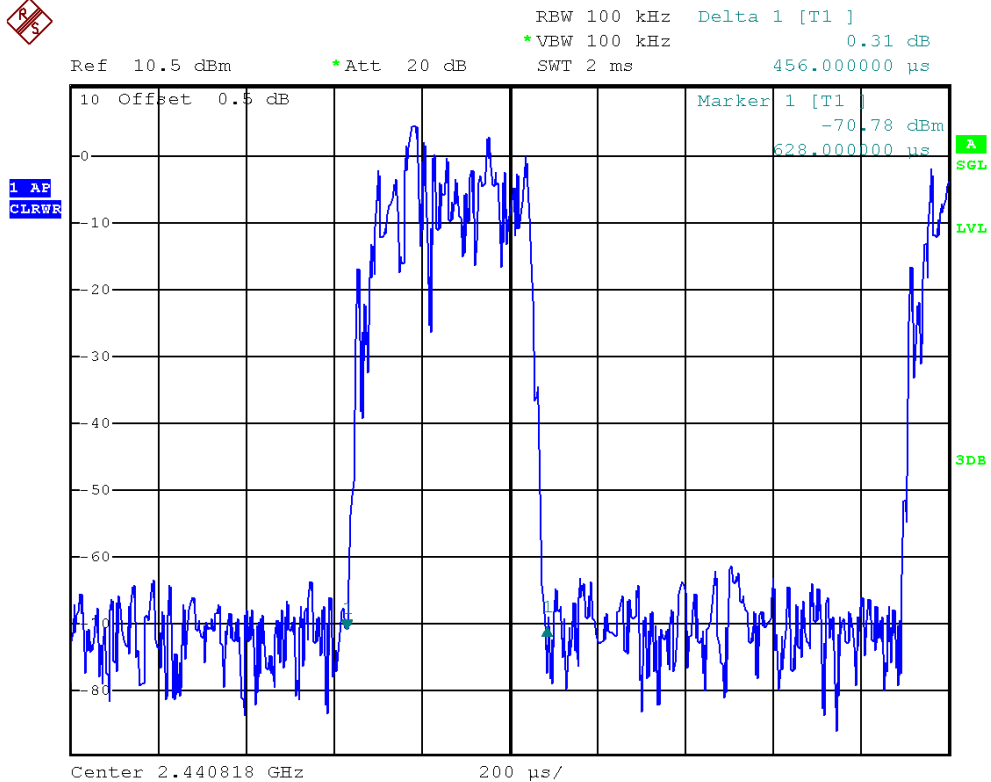




1 Mbps / CH39-DH3



1 Mbps / CH39-DH1

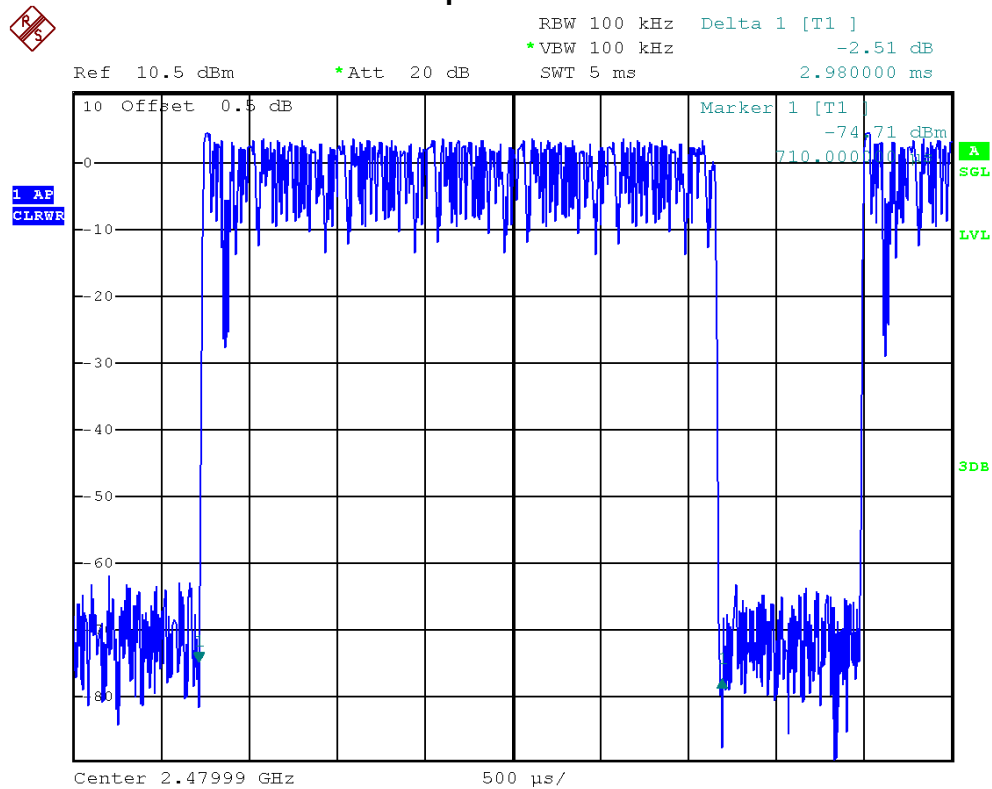




EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	1 Mbps / CH78-DH5/DH3/DH1		

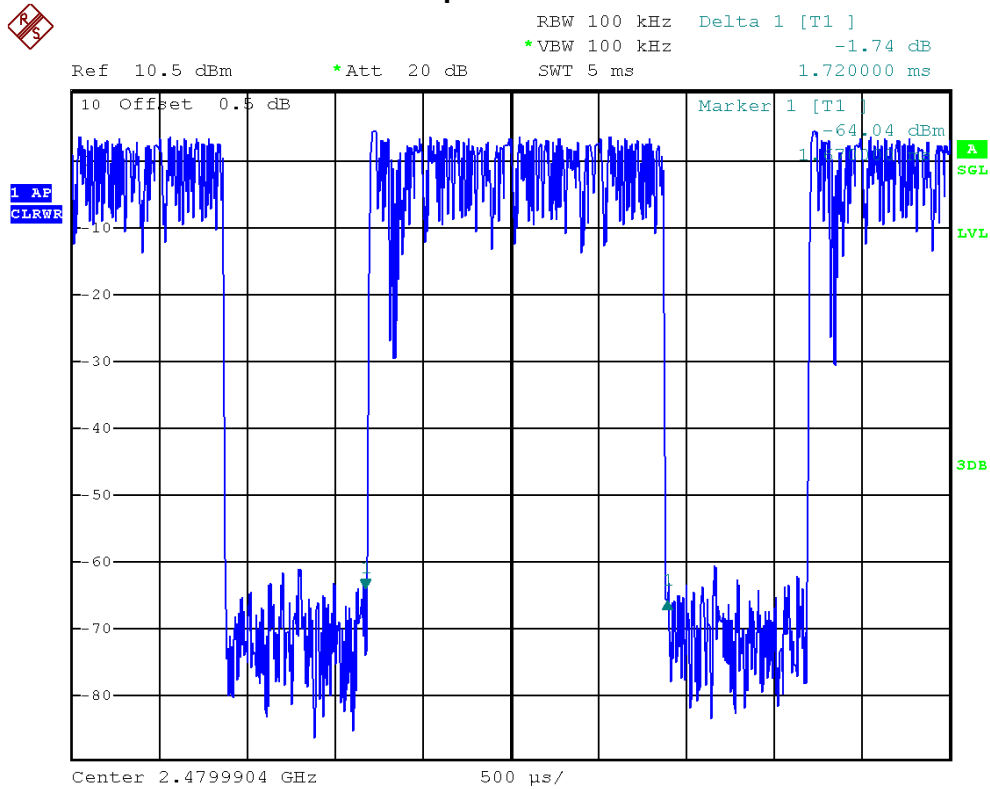
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2480 MHz	2.9800	0.3179	0.4000
DH3	2480 MHz	1.7200	0.2752	0.4000
DH1	2480 MHz	0.4560	0.1459	0.4000

1 Mbps / CH78-DH5

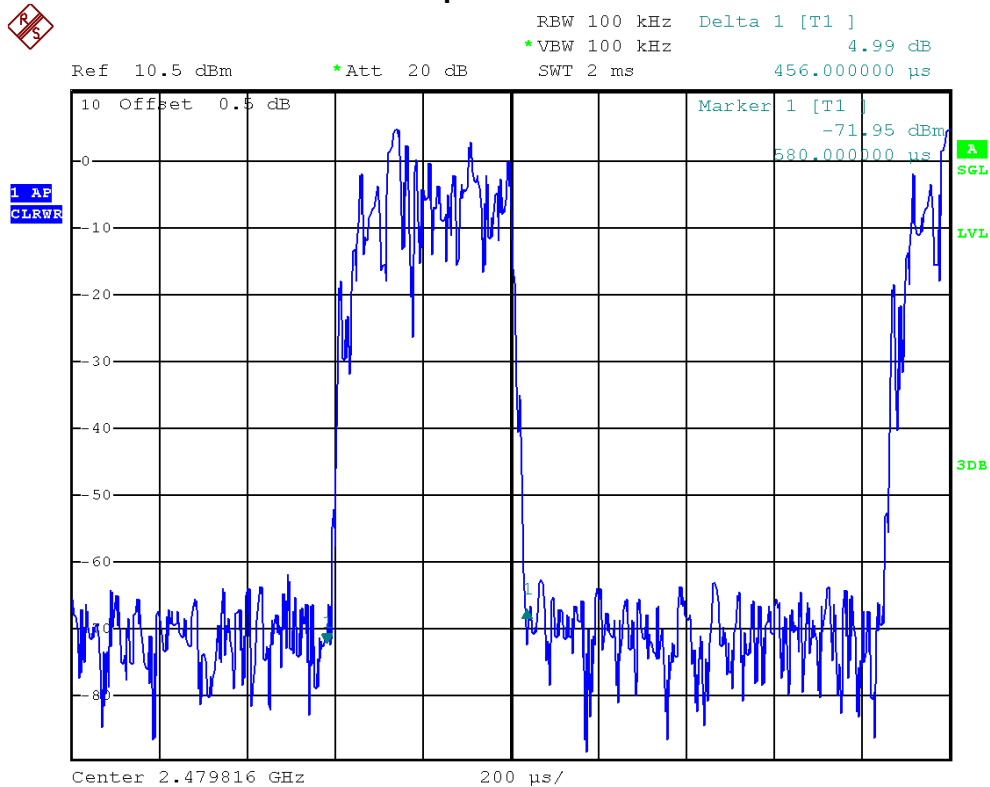




1 Mbps / CH78-DH3



1 Mbps / CH78-DH1

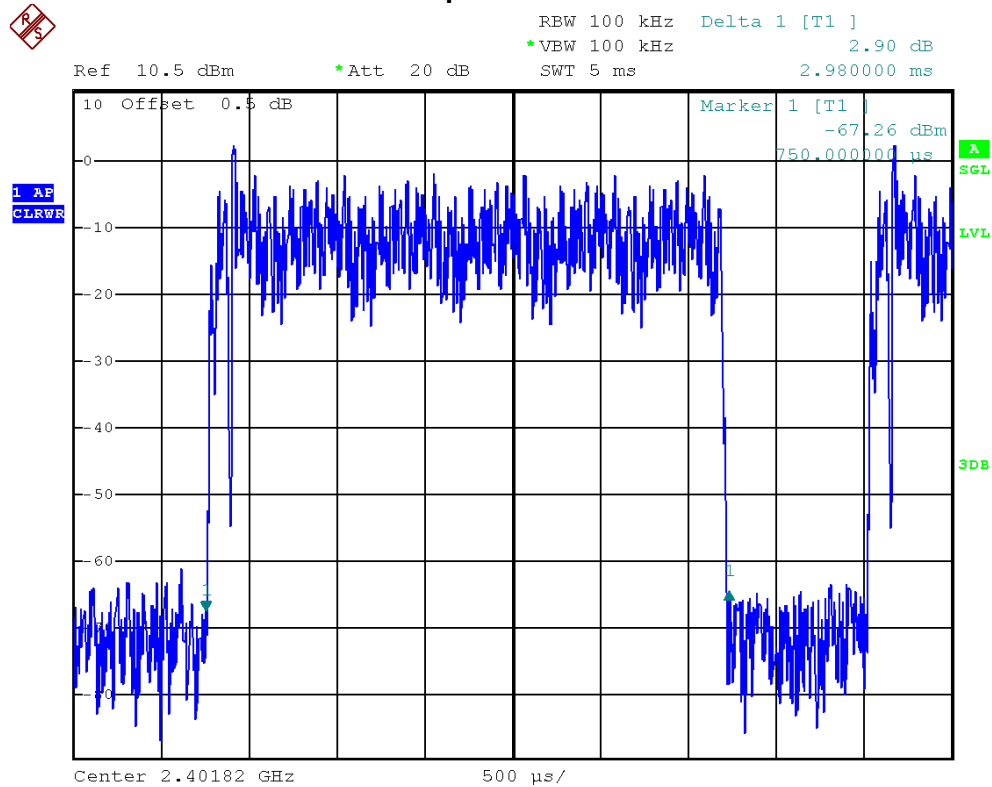




EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	3 Mbps / CH00-DH5/DH3/DH1		

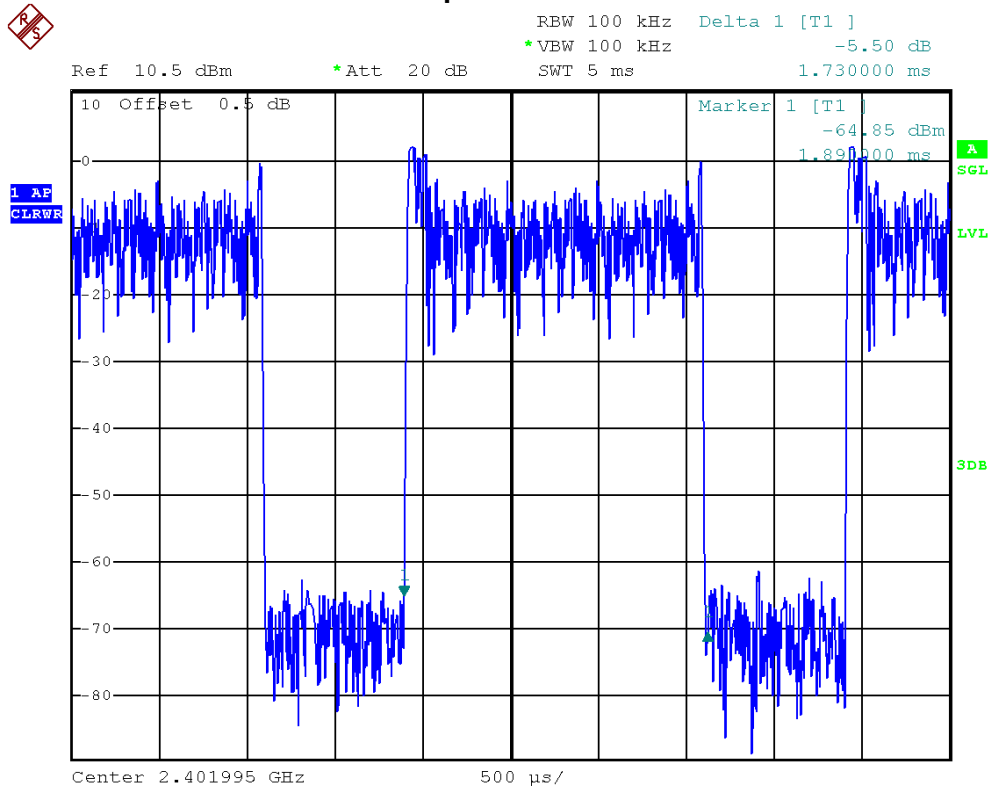
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2402 MHz	2.9800	0.3179	0.4000
DH3	2402 MHz	1.7300	0.2768	0.4000
DH1	2402 MHz	0.4650	0.1488	0.4000

3 Mbps / CH00-DH5

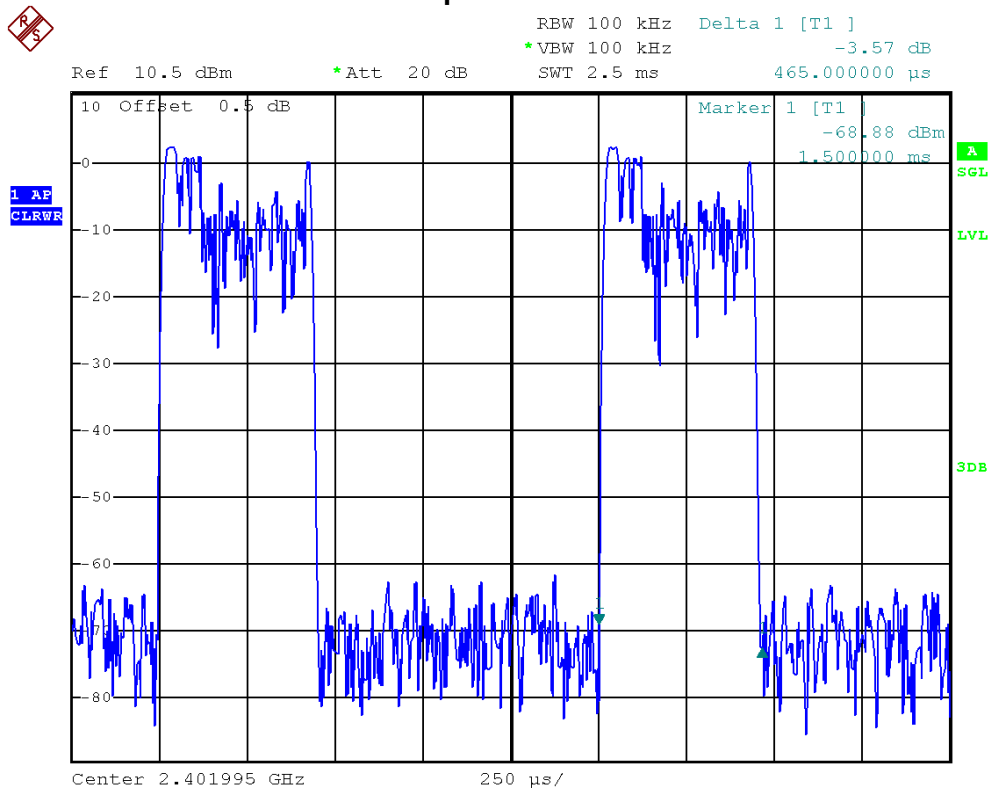




3 Mbps / CH00-DH3



3 Mbps / CH00-DH1

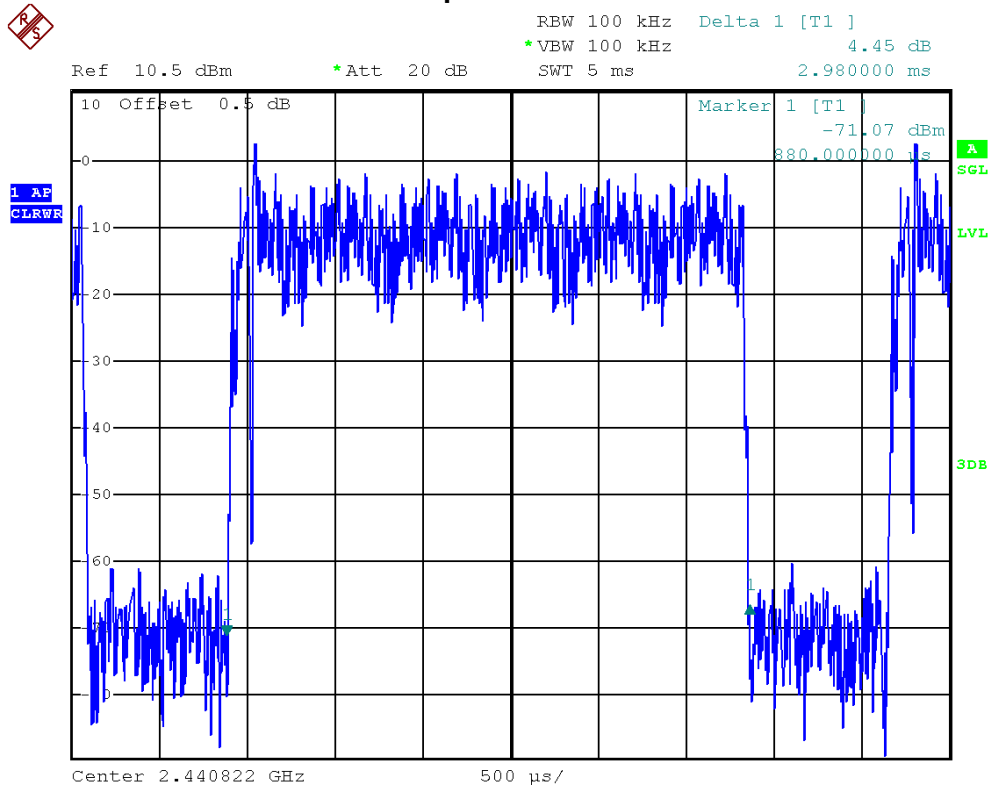




EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	3 Mbps / CH39-DH5/DH3/DH1		

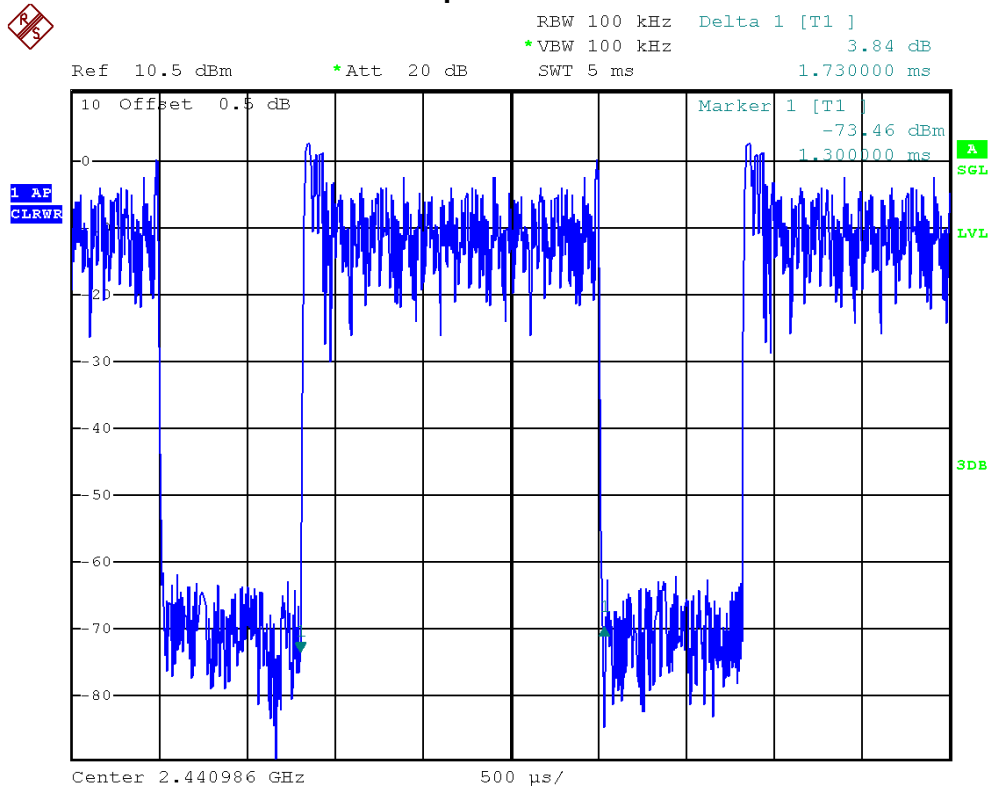
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2441 MHz	2.9800	0.3179	0.4000
DH3	2441 MHz	1.7300	0.2768	0.4000
DH1	2441 MHz	0.4700	0.1504	0.4000

3 Mbps / CH39-DH5

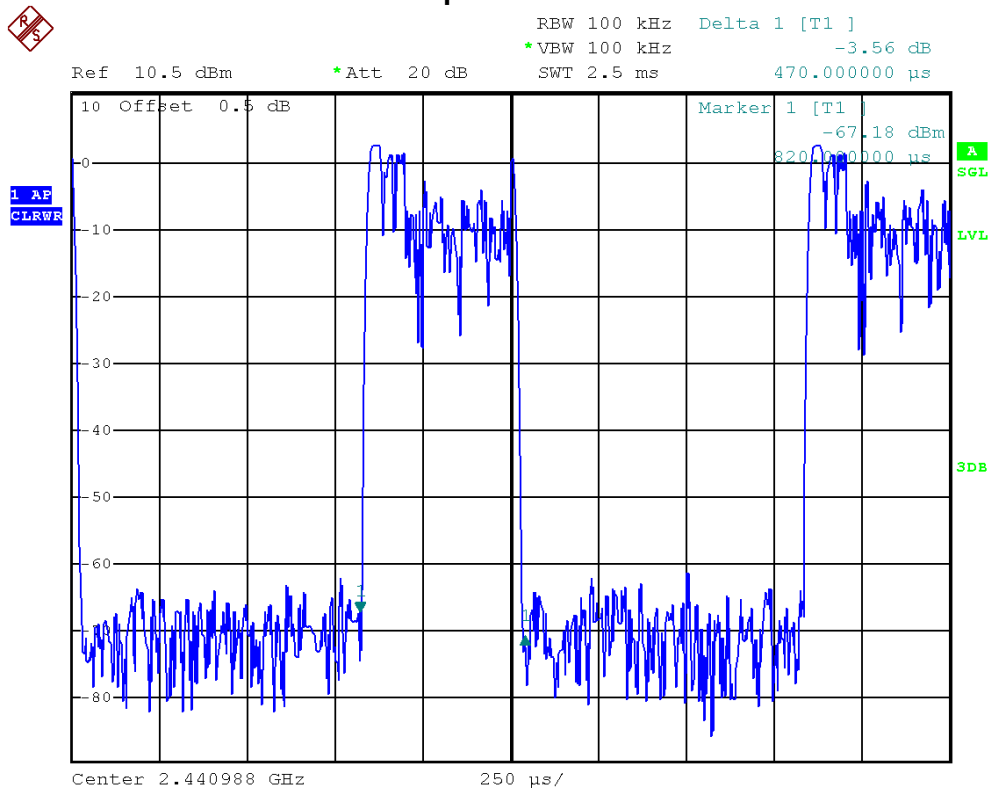




3 Mbps / CH39-DH3



3 Mbps / CH39-DH1

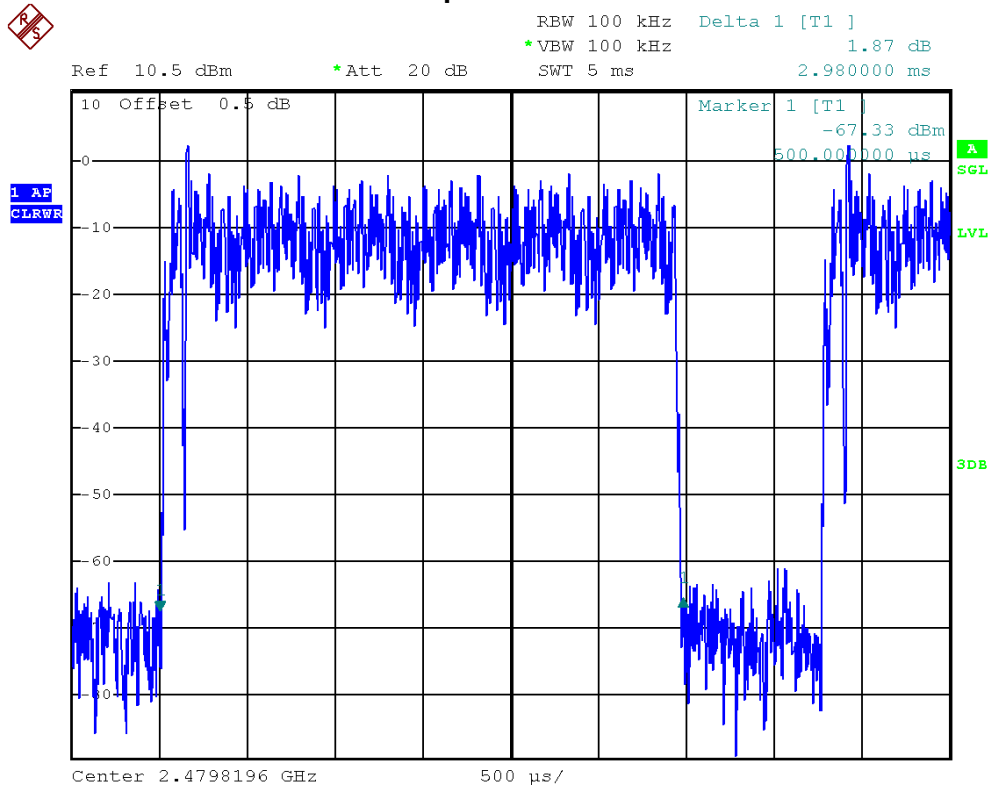




EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	3 Mbps / CH78-DH5/DH3/DH1		

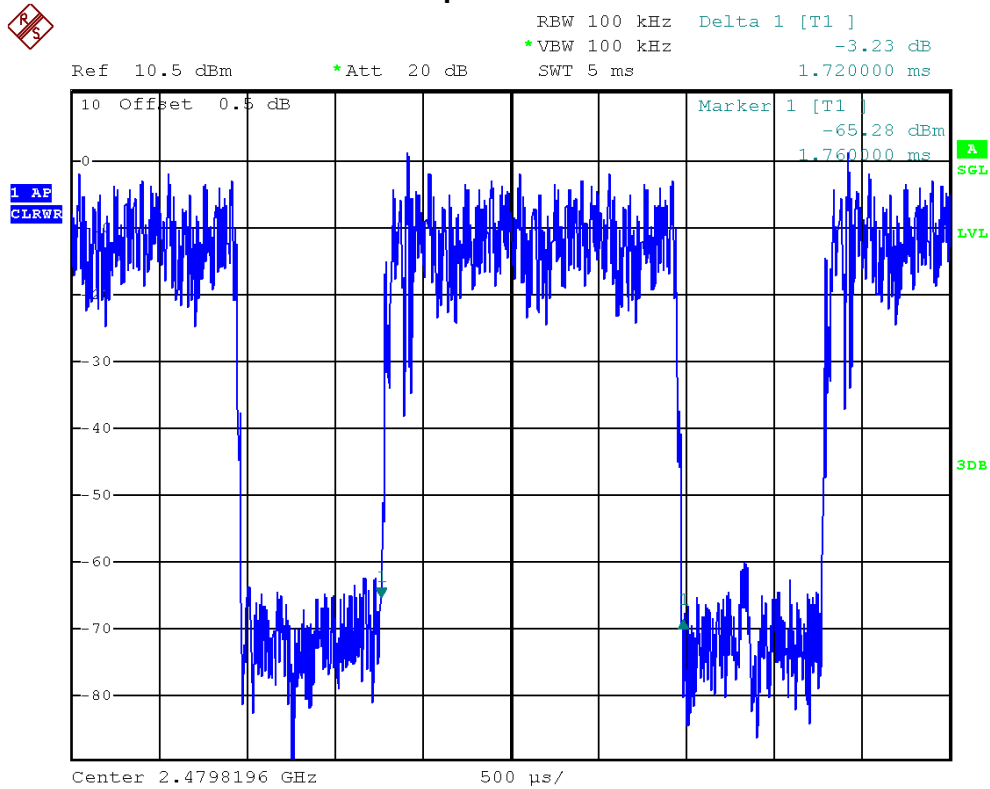
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2480 MHz	2.9800	0.3179	0.4000
DH3	2480 MHz	1.7200	0.2752	0.4000
DH1	2480 MHz	0.4700	0.1504	0.4000

3 Mbps / CH78-DH5

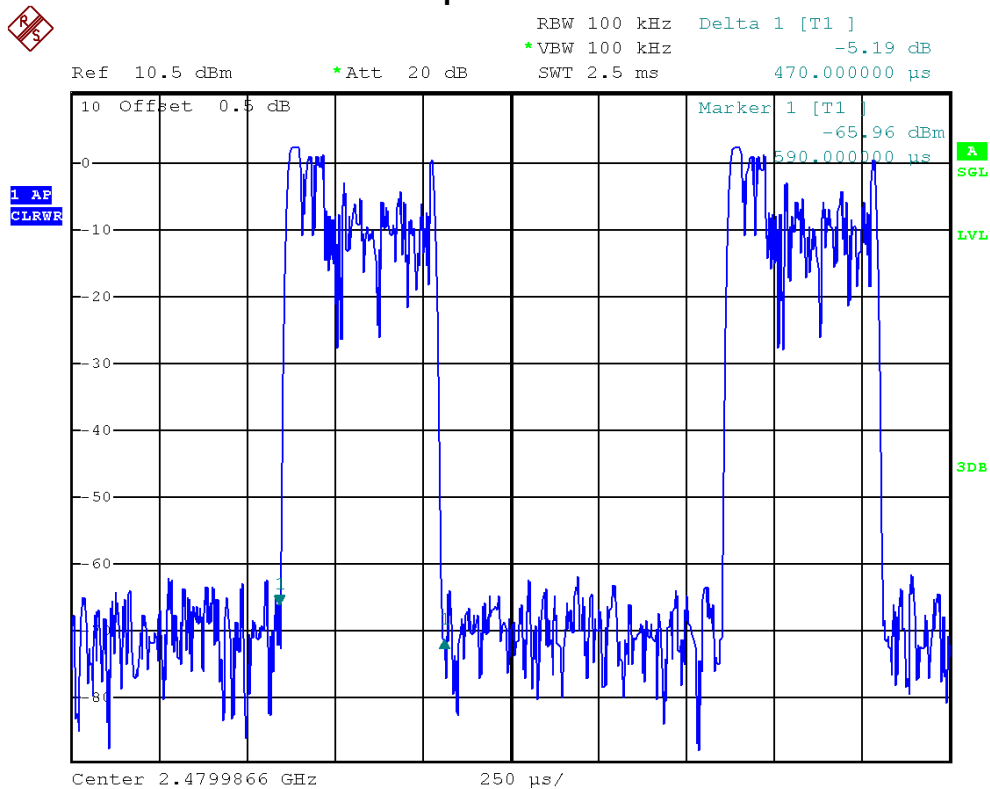




3 Mbps / CH78-DH3



3 Mbps / CH78-DH1



**7. HOPPING CHANNEL SEPARATION MEASUREMENT & BANDWIDTH 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.

7.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Aug. 30, 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

7.1.2 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.

7.1.3 DEVIATION FROM STANDARD

No deviation.

7.1.4 TEST SETUP**7.1.5 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.

**7.1.6 TEST RESULTS**

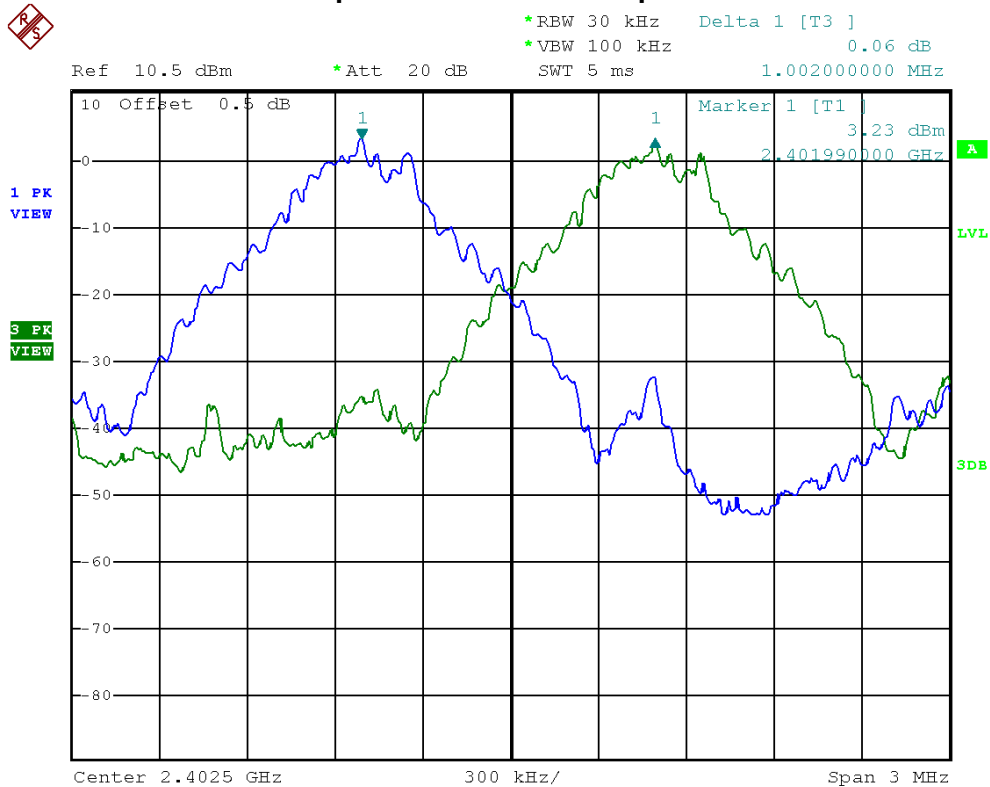
EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 ° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	1 Mbps / CH00, CH39, CH78		

Frequency	Channel Separation (MHz)	99% Occupied BW (MHz)	20 dB Bandwidth (MHz)	Two-thirds of the 20 dB Bandwidth	Result
2402 MHz	1.00	0.884	0.940	0.626	PASS
2441 MHz	1.00	0.884	0.936	0.624	PASS
2480 MHz	1.00	0.876	0.932	0.621	PASS

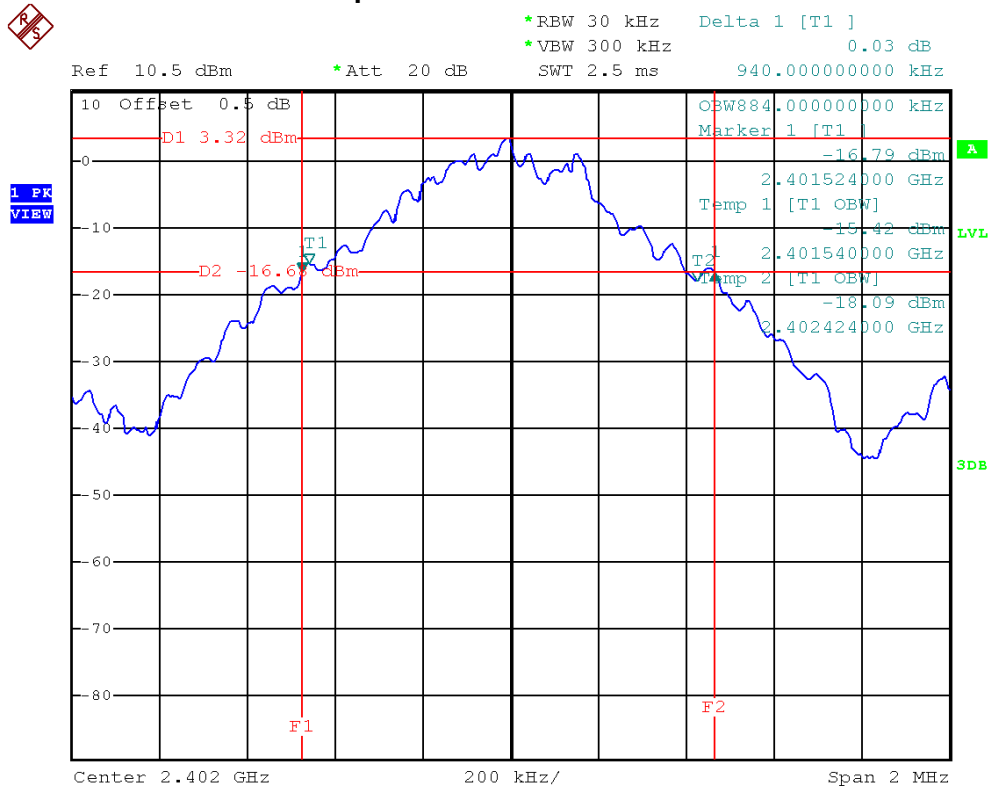
Ch. Separation Limits: >25 KHz or >2/3 of 20dB bandwidth



1 Mbps / CH00-Channel Separation

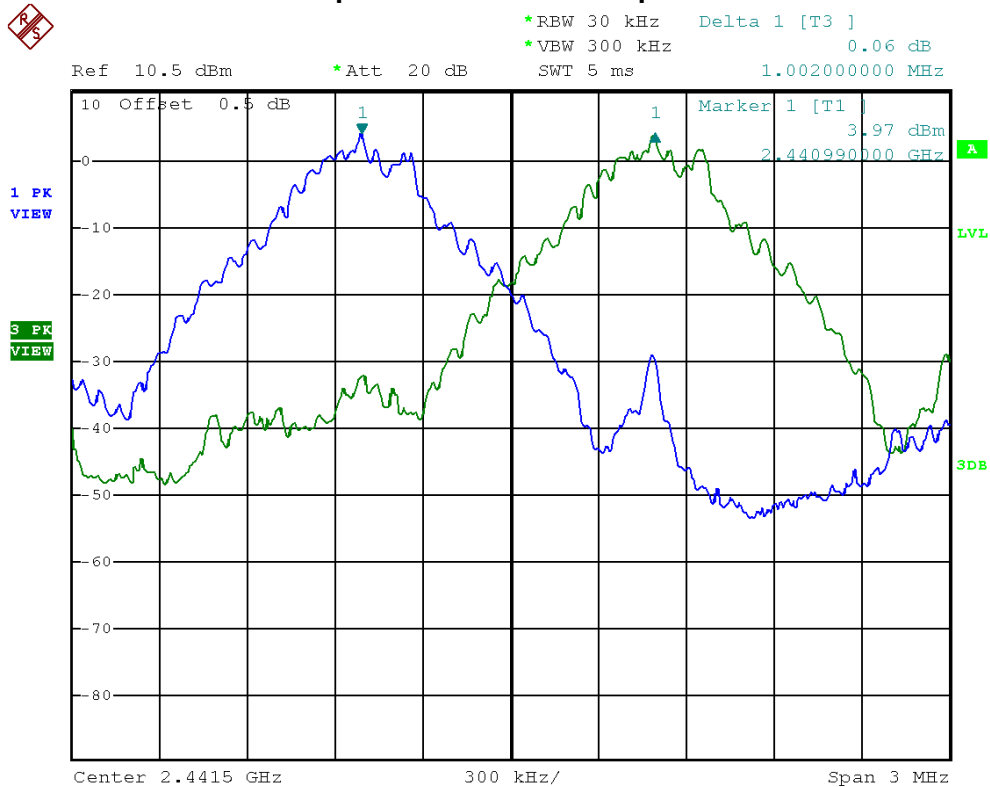


1 Mbps / CH00- 20dB Bandwidth

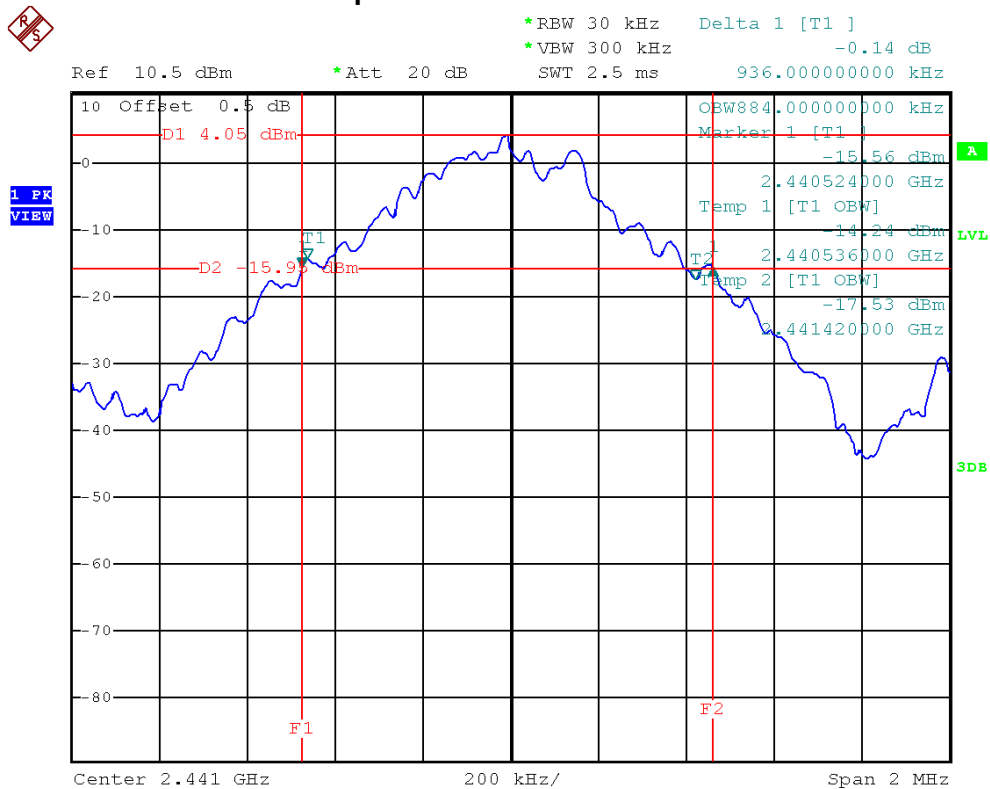




1 Mbps / CH39-Channel Separation

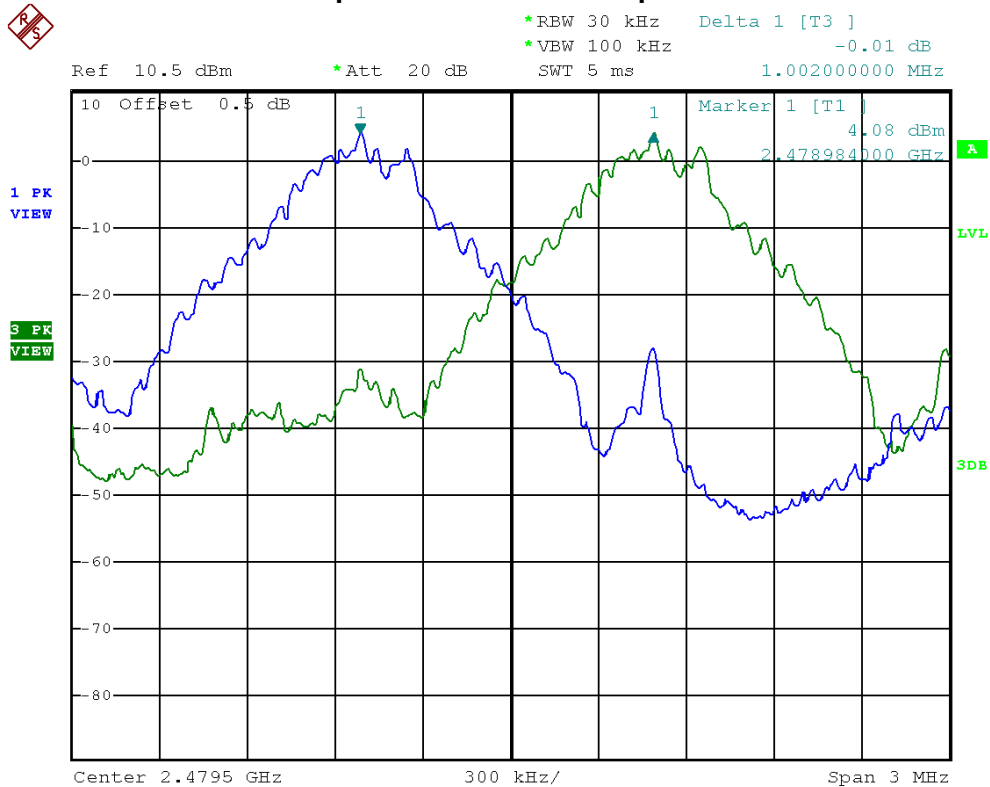


1 Mbps / CH39- 20dB Bandwidth

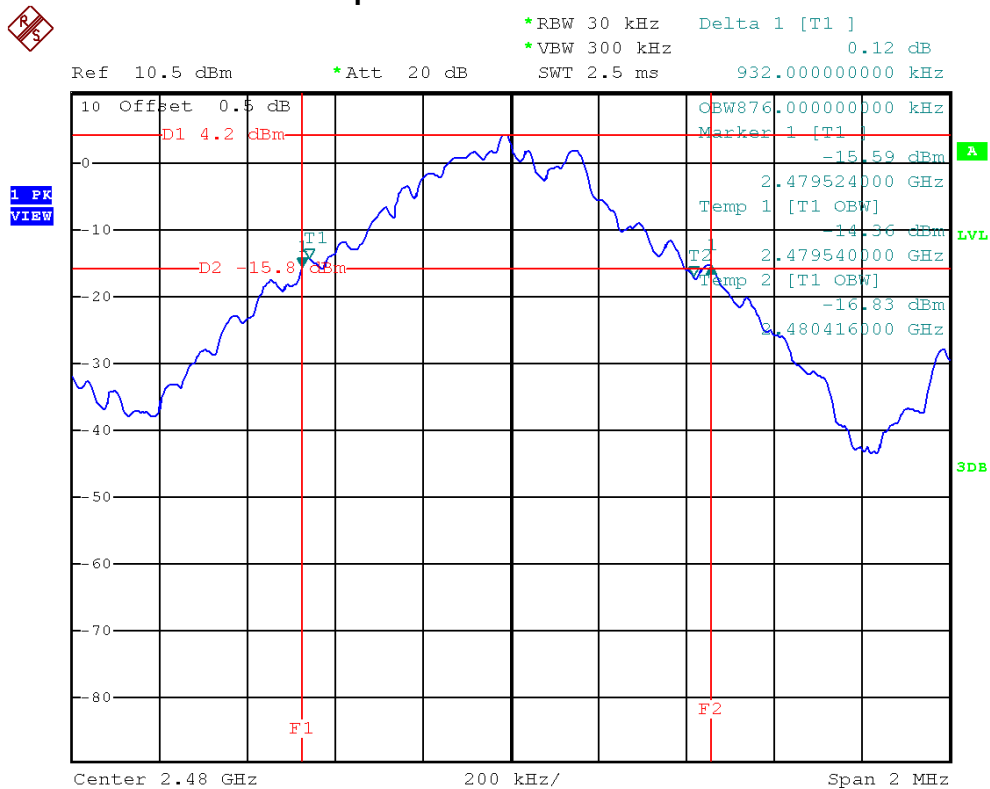




1 Mbps / CH78-Channel Separation



1 Mbps / CH78- 20dB Bandwidth





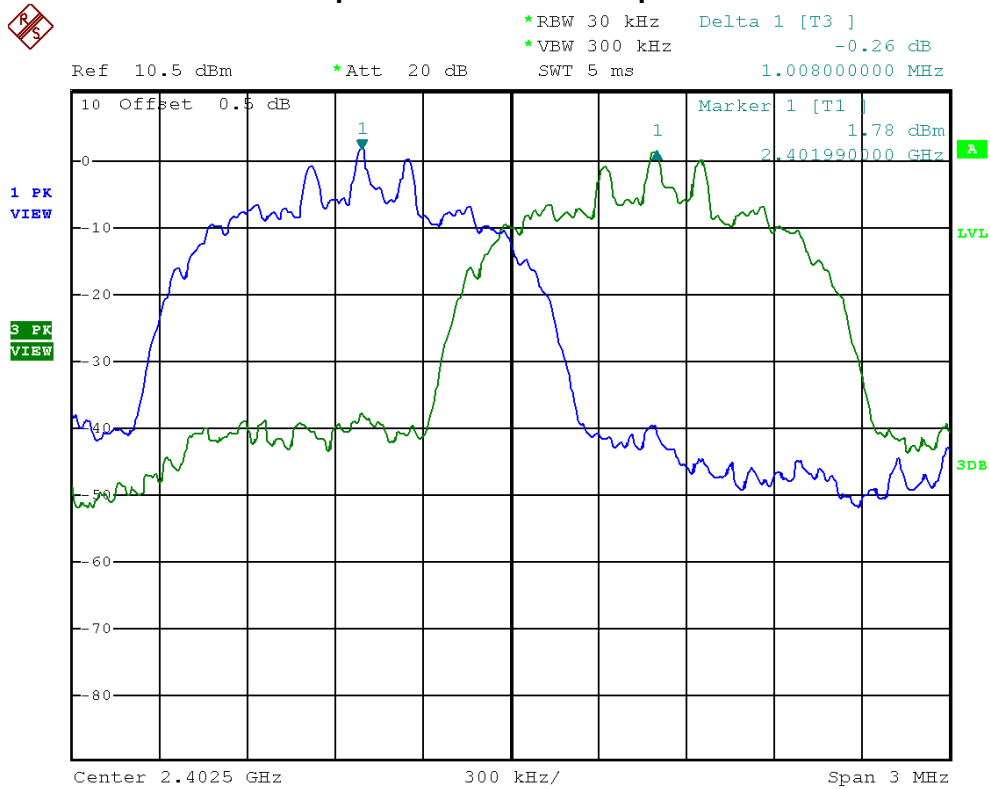
EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 ° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	3 Mbps / CH00, CH39, CH78		

Frequency	Channel Separation (MHz)	99% Occupied BW (MHz)	20 dB Bandwidth (MHz)	Two-thirds of the 20 dB Bandwidth	Result
2402 MHz	1.01	1.172	1.260	0.840	PASS
2441 MHz	1.00	1.170	1.254	0.836	PASS
2480 MHz	1.00	1.164	1.256	0.837	PASS

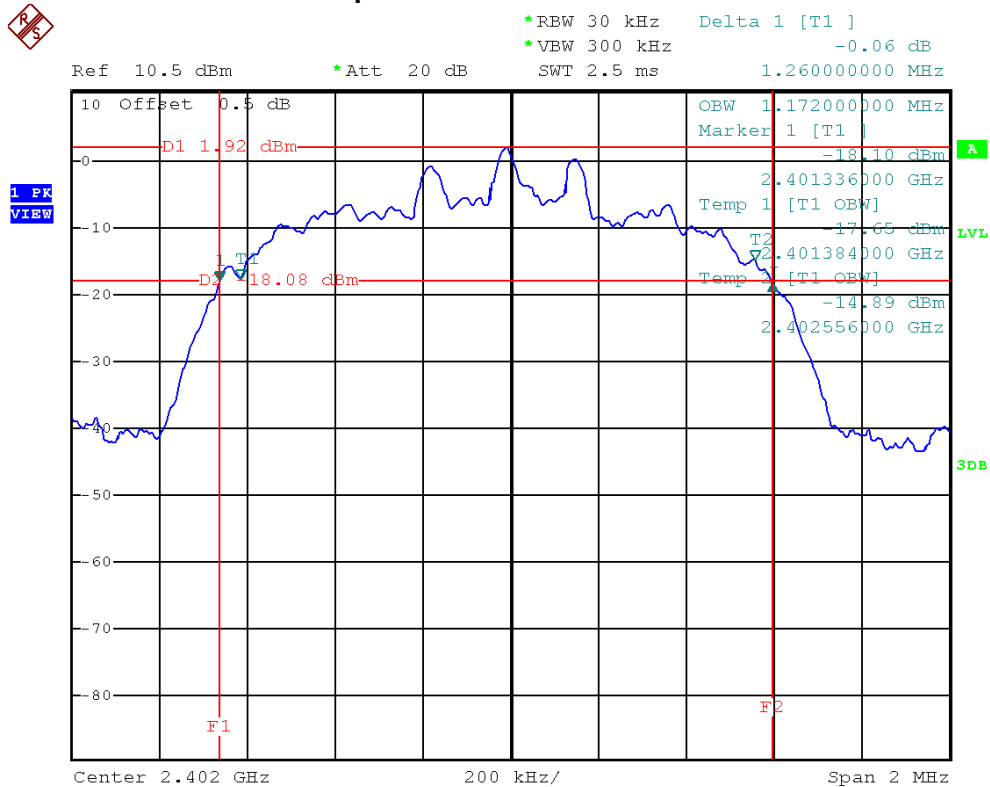
Ch. Separation Limits: >25 KHz or >2/3 of 20dB bandwidth



3 Mbps / CH00-Channel Separation

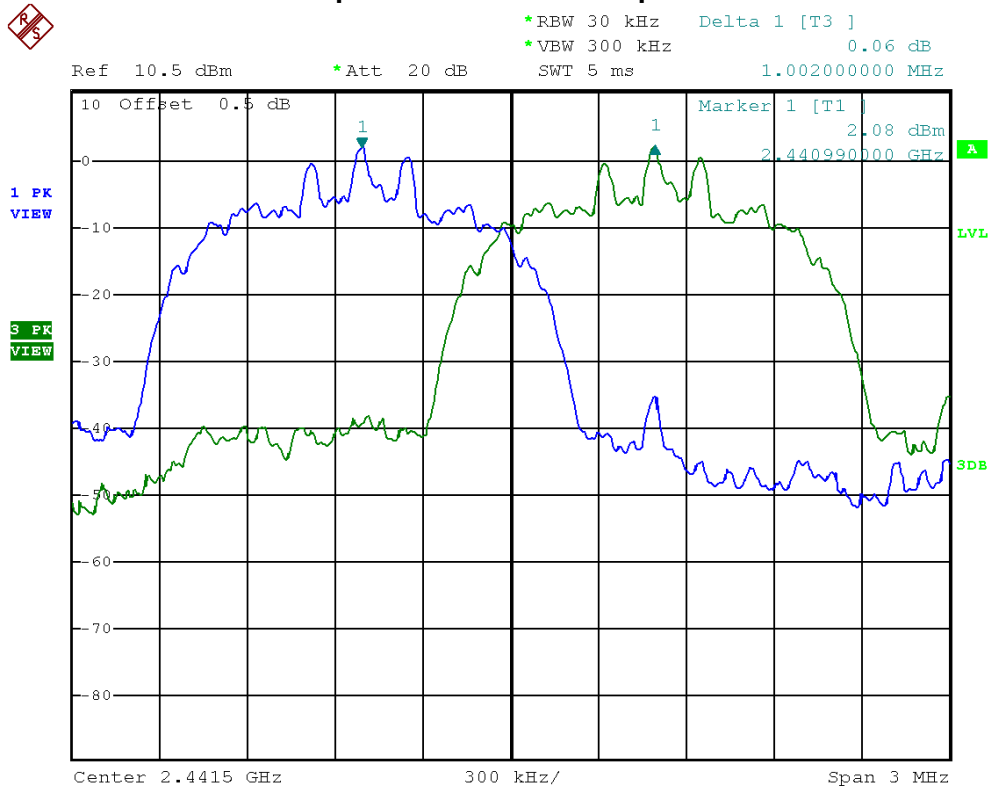


3 Mbps / CH00- 20dB Bandwidth

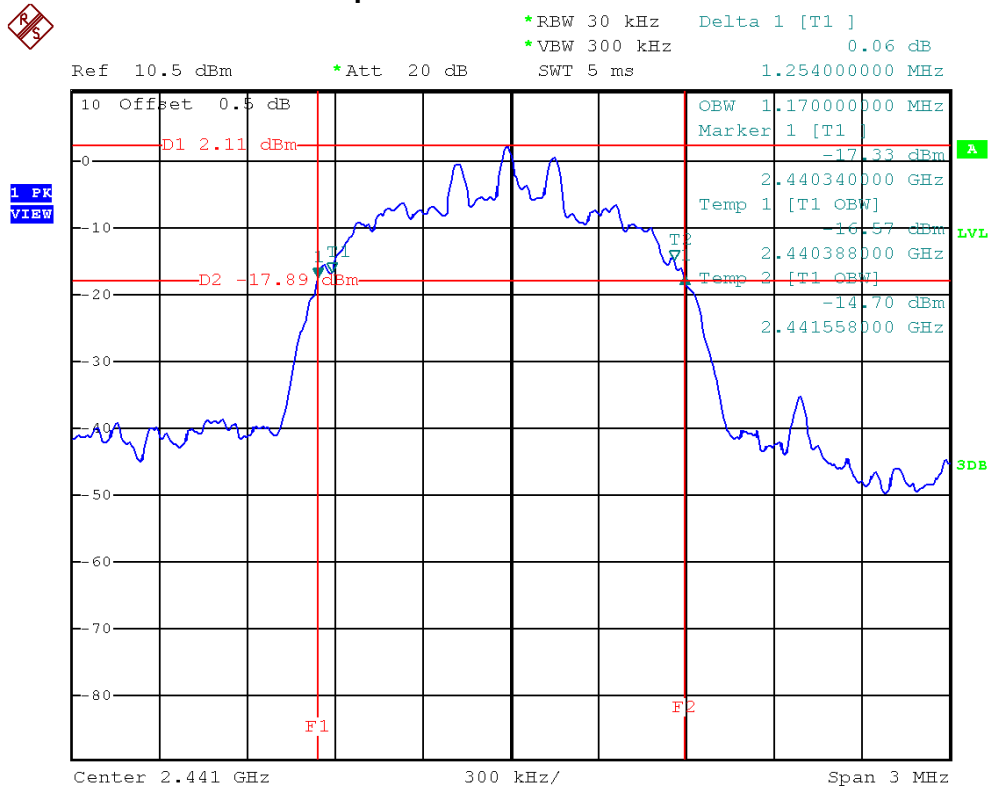




3 Mbps / CH39-Channel Separation

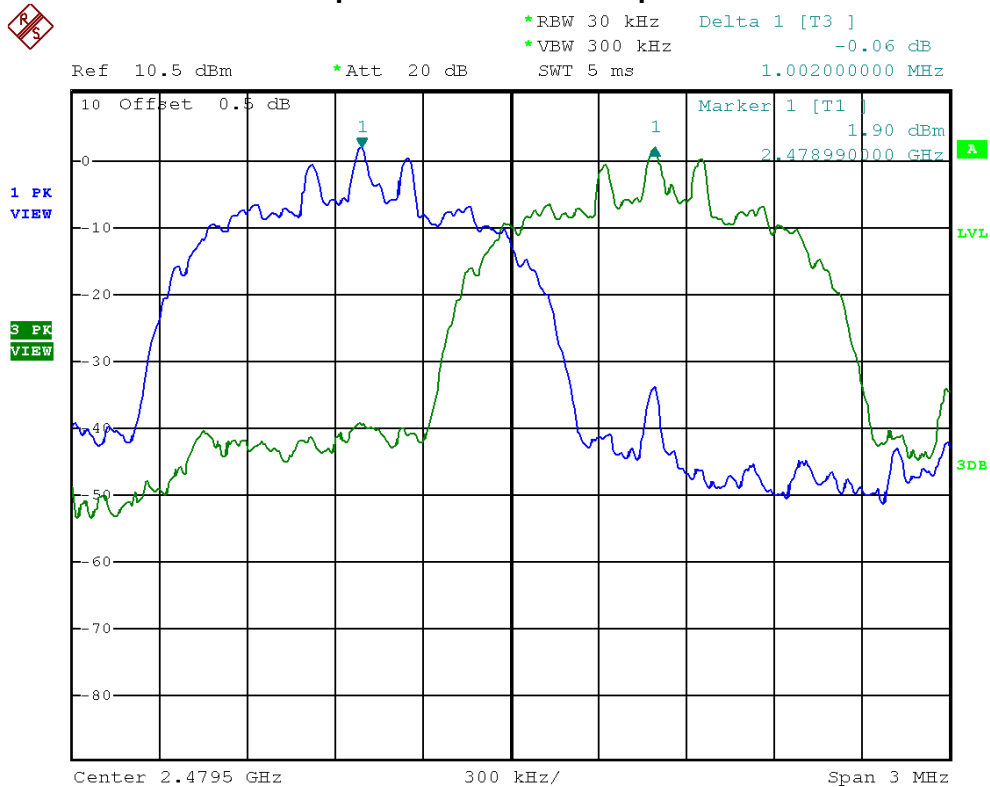


3 Mbps / CH39- 20dB Bandwidth

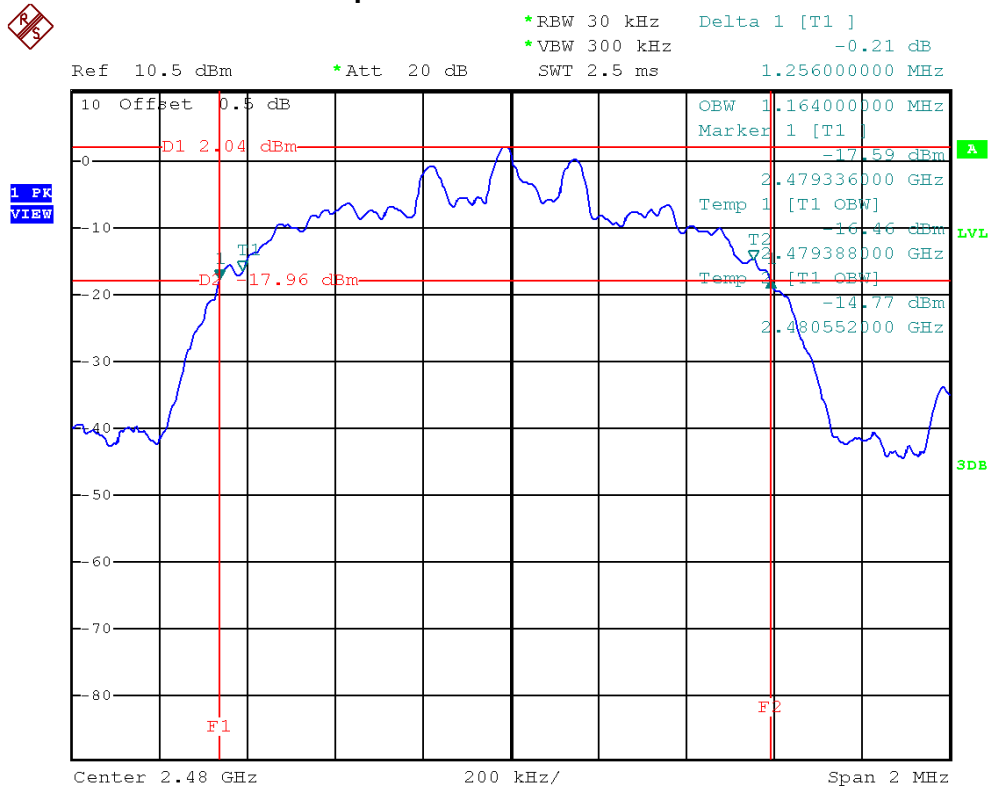




3 Mbps / CH78-Channel Separation



3 Mbps / CH78- 20dB Bandwidth



**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

8.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Aug. 30, 2012

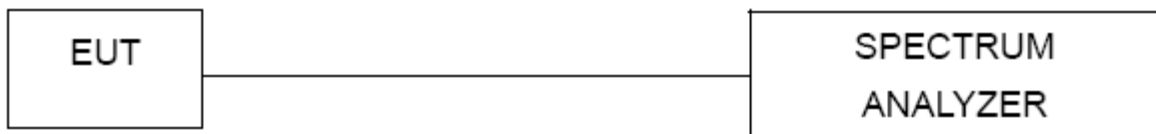
Remark: " N/A" denotes No Model Name , Serial No. or No Calibration specified.

8.1.2 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.

8.1.3 DEVIATION FROM STANDARD

No deviation.

8.1.4 TEST SETUP**8.1.5 EUT OPERATION CONDITIONS**

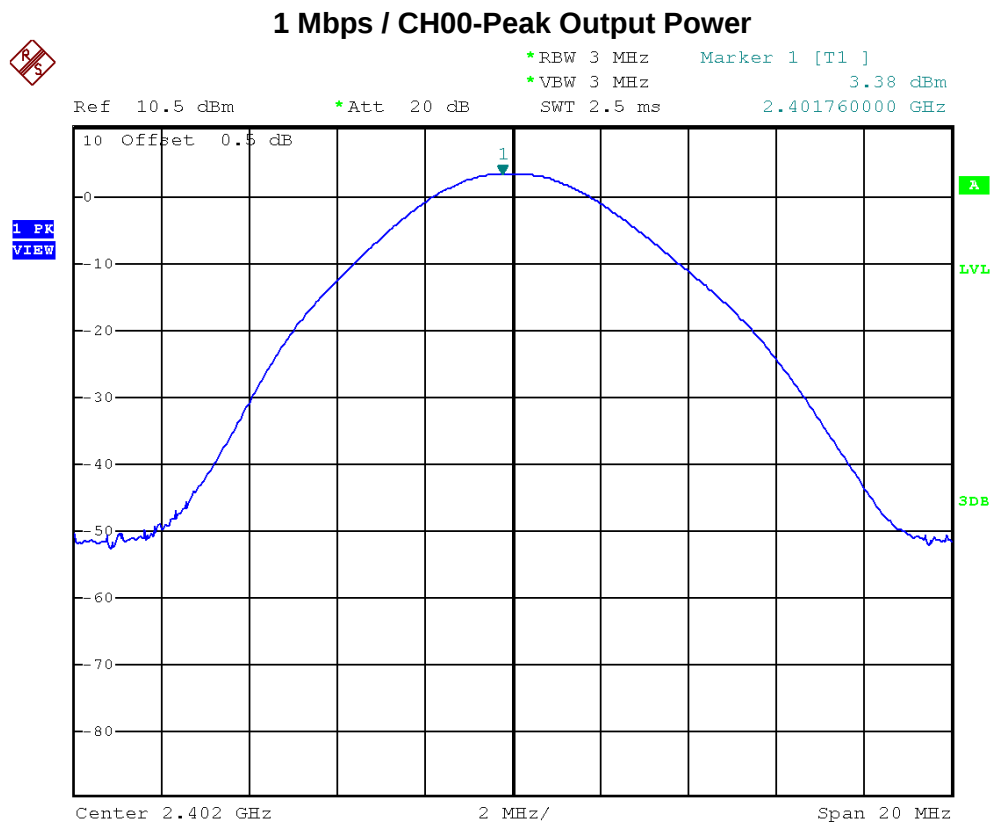
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.



8.1.6 TEST RESULTS

EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	1 Mbps / CH00, CH39, CH78		

Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
2402	3.38	30	1
2441	4.11	30	1
2480	4.16	30	1





1 Mbps / CH39-Peak Output Power



*RBW 3 MHz Marker 1 [T1]
*VBW 3 MHz 4.11 dBm
SWT 2.5 ms 2.440800000 GHz

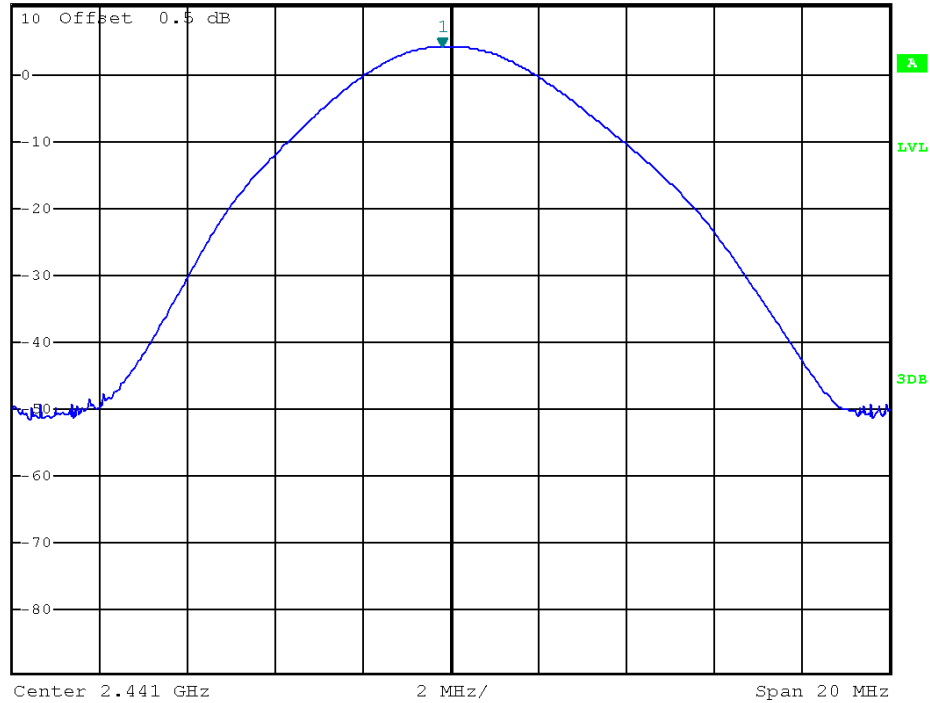
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 ms

2.440800000 GHz

1 PK
VIEW



1 Mbps / CH78-Peak Output Power



*RBW 3 MHz Marker 1 [T1]
*VBW 3 MHz 4.16 dBm
SWT 2.5 ms 2.479760000 GHz

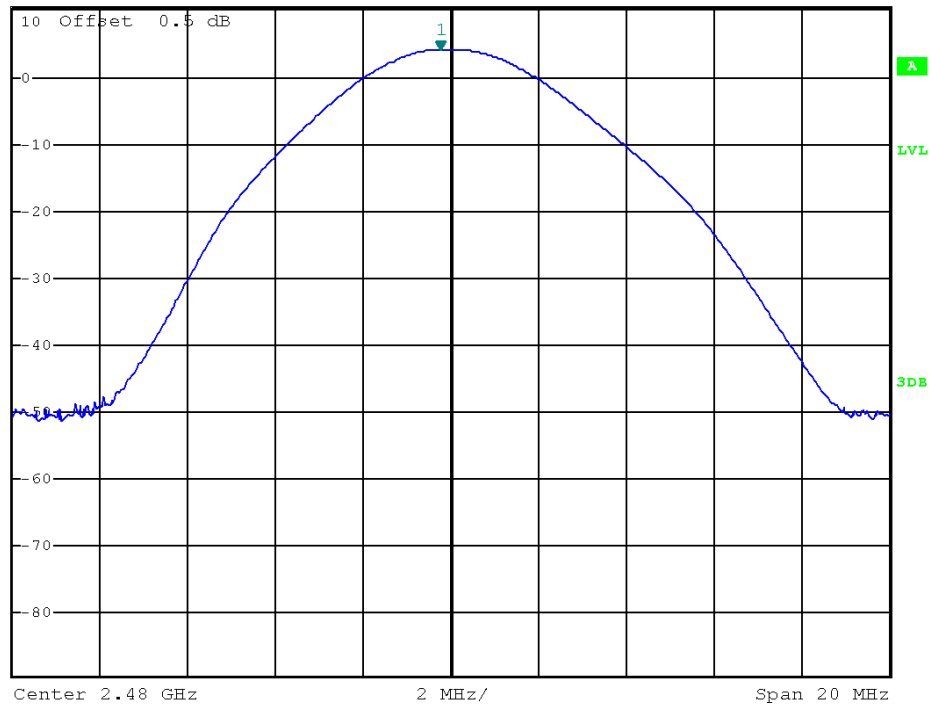
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 ms

2.479760000 GHz

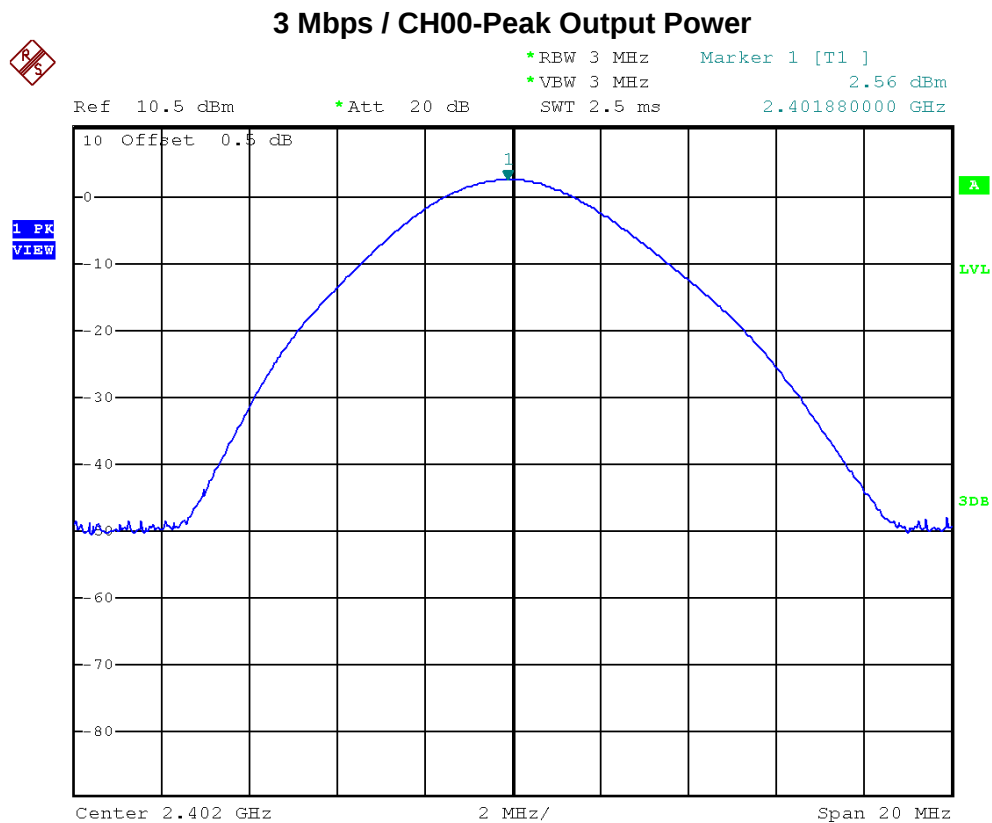
1 PK
VIEW





EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 °C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	3 Mbps / CH00, CH39, CH78		

Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
2402	2.56	30	1
2441	3.00	30	1
2480	2.77	30	1





3 Mbps / CH39-Peak Output Power



*RBW 3 MHz Marker 1 [T1]
*VBW 3 MHz 3.00 dBm
SWT 2.5 ms 2.440920000 GHz

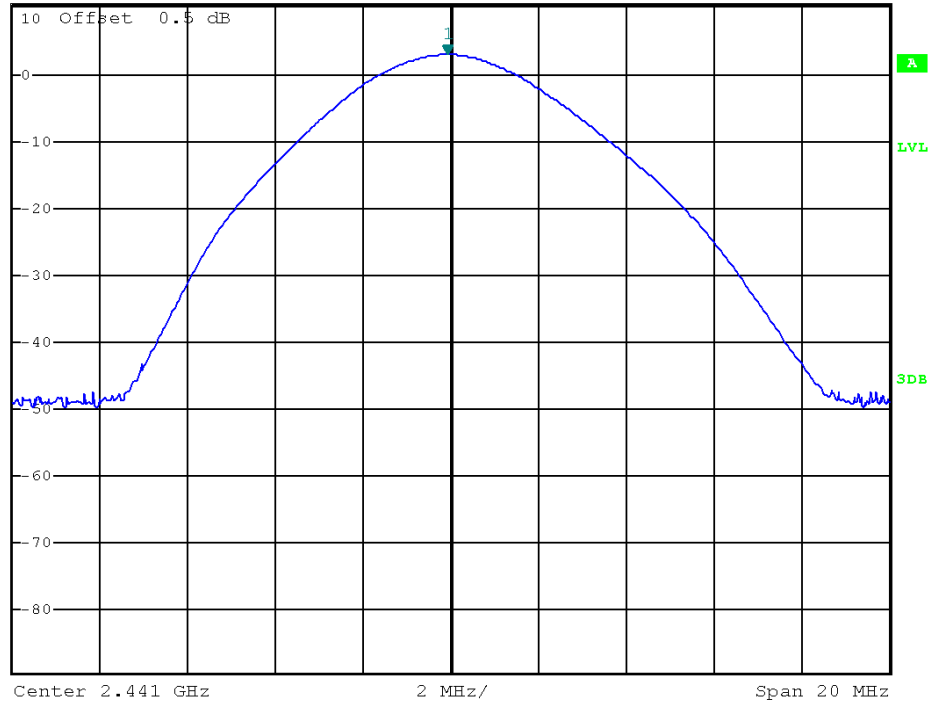
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 ms

2.440920000 GHz

1 PK
VIEW



3 Mbps / CH78-Peak Output Power



*RBW 3 MHz Marker 1 [T1]
*VBW 3 MHz 2.77 dBm
SWT 2.5 ms 2.479840000 GHz

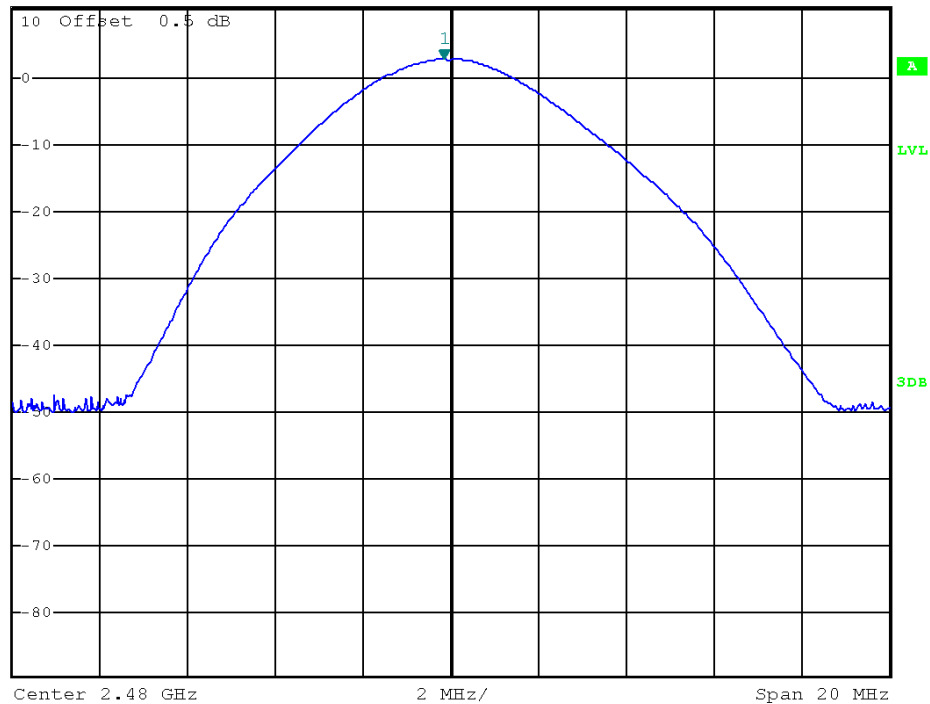
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 ms

2.479840000 GHz

1 PK
VIEW



**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

9.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Aug. 30, 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

9.1.2 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.

9.1.3 DEVIATION FROM STANDARD

No deviation.



9.1.4 TEST SETUP



9.1.5 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.

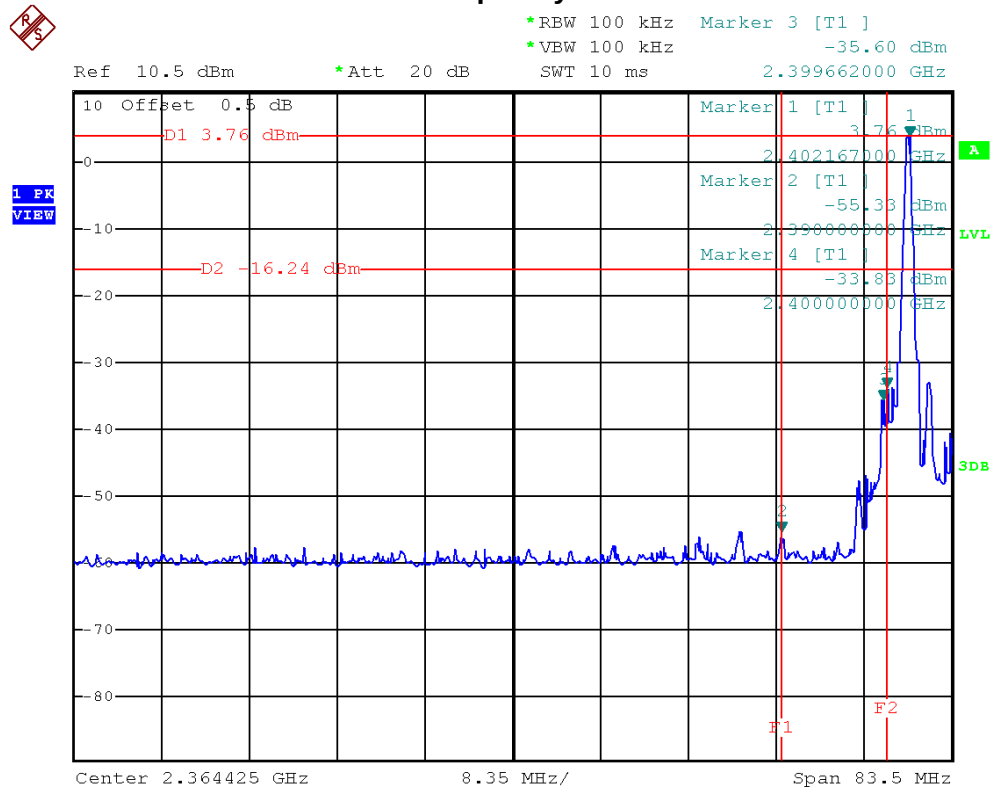
**9.1.6 TEST RESULTS**

EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26 ° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	1 Mbps / CH00, CH39, CH78		

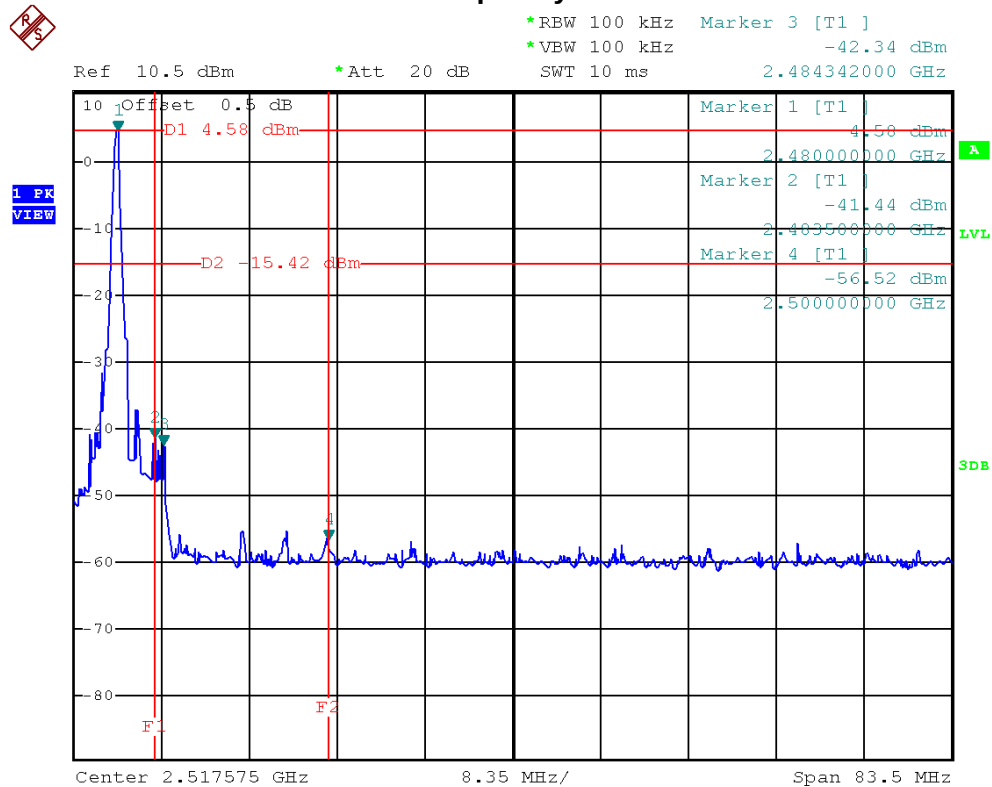
The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2399.662	-35.60	2484.342	-42.34
Result			
In any 100kHz bandwidth outside the frequency 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.			



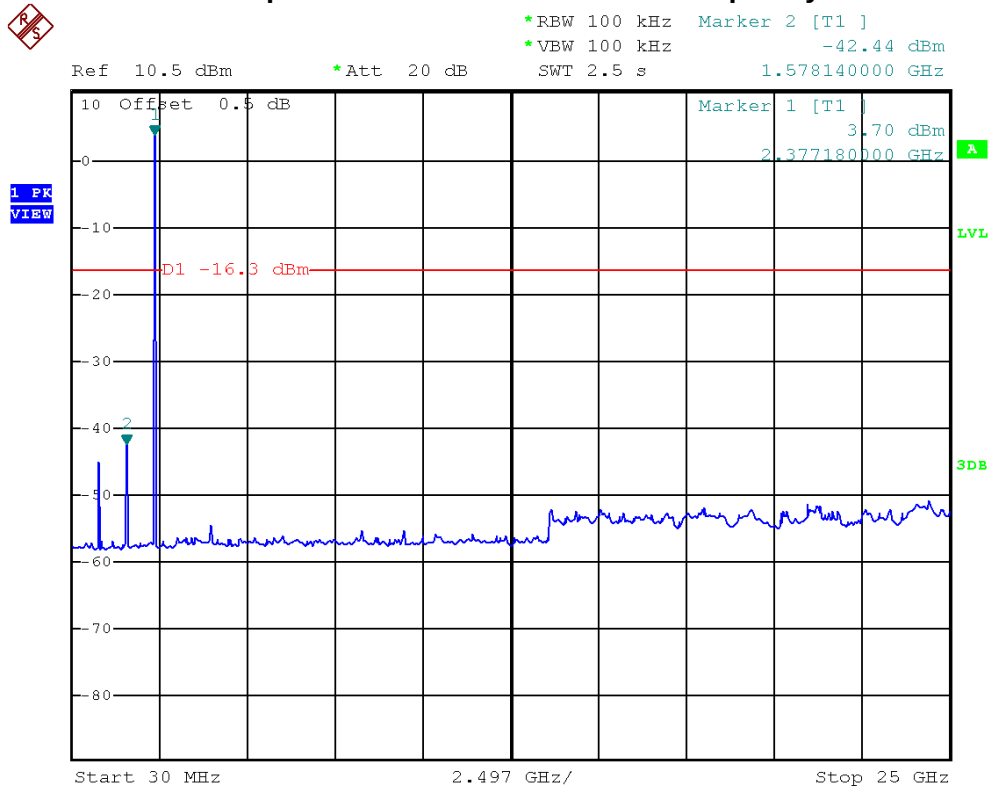
1 Mbps / CH00-The max. radio frequency power in any 100kHz bandwidth outside the frequency band



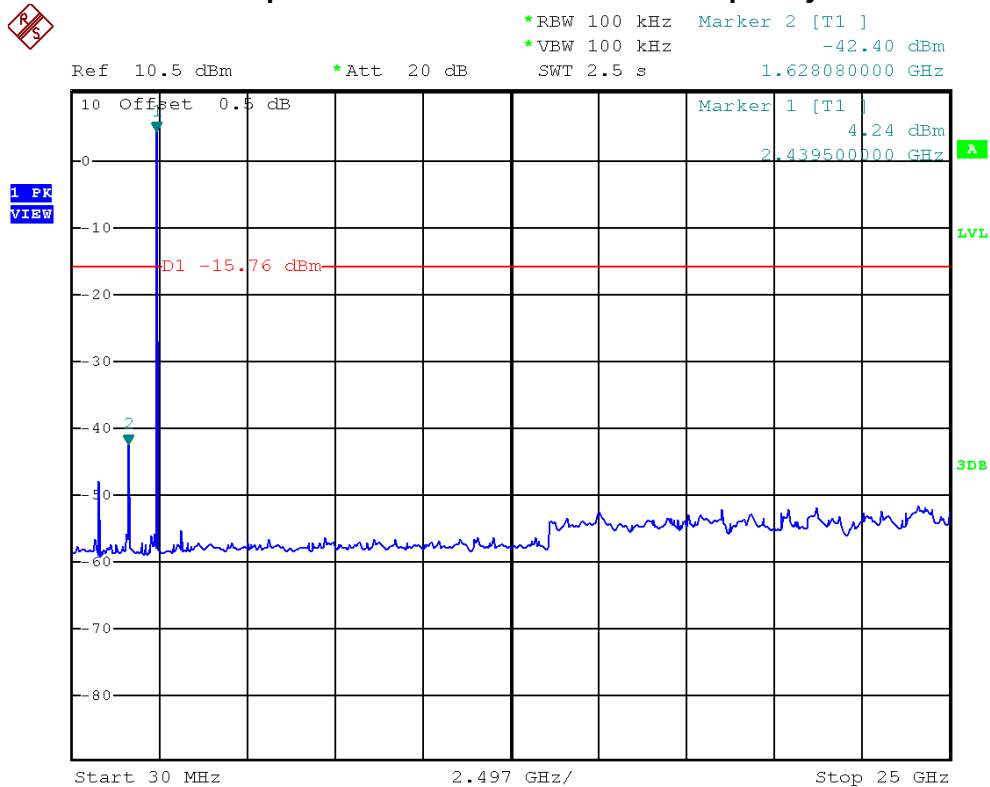
1 Mbps / CH78-The max. radio frequency power in any 100 kHz bandwidth within the frequency band



1 Mbps / CH00-10 Harmonic of the frequency



1 Mbps / CH39-10 Harmonic of the frequency





1 Mbps / CH78-10 Harmonic of the frequency



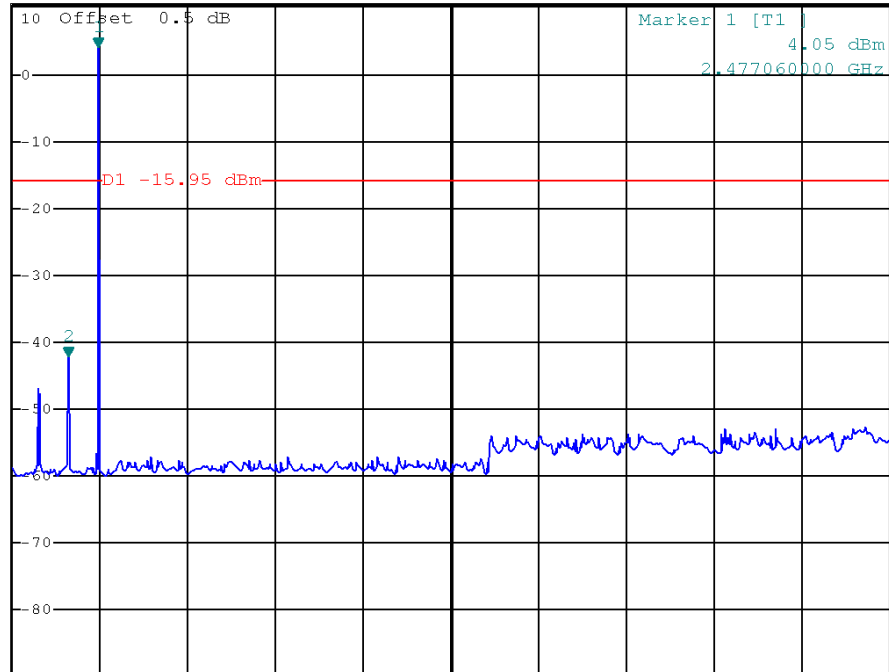
*RBW 100 kHz Marker 2 [T1]
*VBW 100 kHz -42.21 dBm
SWT 2.5 s 1.628080000 GHz

Ref 10.5 dBm

*Att 20 dB

Offset 0.5 dB
Marker 1 [T1]
4.05 dBm
2.477060000 GHz

1 PK
VIEW



Center 12.515 GHz

2.497 GHz/

Span 24.97 GHz

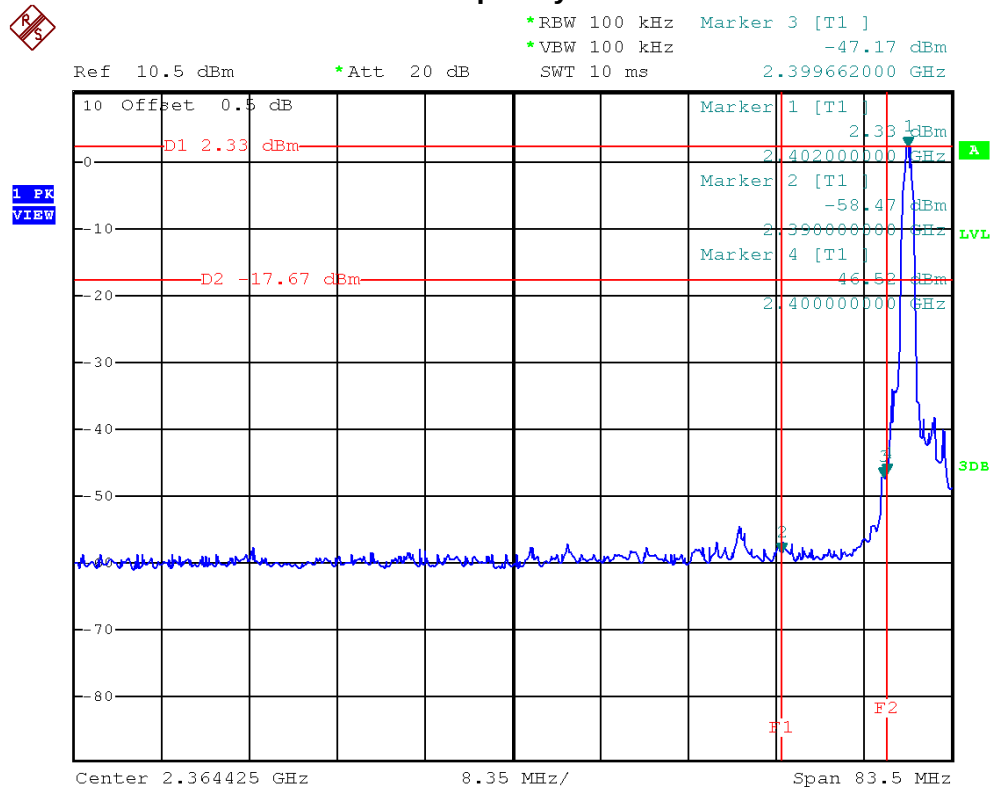


EUT :	Bluetooth Barcode Scanner	Model Name :	1664
Temperature :	26° C	Relative Humidity :	60%
Test Voltage :	DC 3.7V (Normal)		
Test Mode :	3 Mbps / CH00, CH39, CH78		

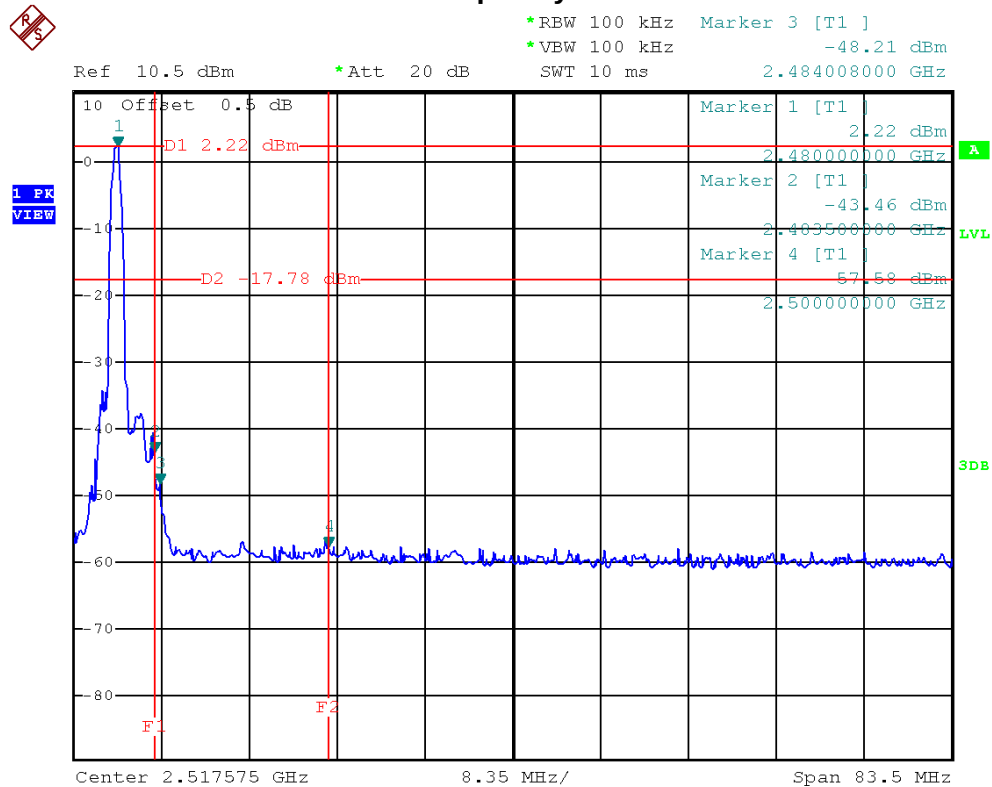
The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2399.662	-47.17	2480.000	-48.21
Result			
In any 100kHz bandwidth outside the frequency 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.			



3 Mbps / CH00-The max. radio frequency power in any 100kHz bandwidth outside the frequency band



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



3 Mbps / CH00-10 Harmonic of the frequency



*RBW 100 kHz Marker 2 [T1]
*VBW 100 kHz -42.91 dBm
SWT 2.5 s 1.578140000 GHz

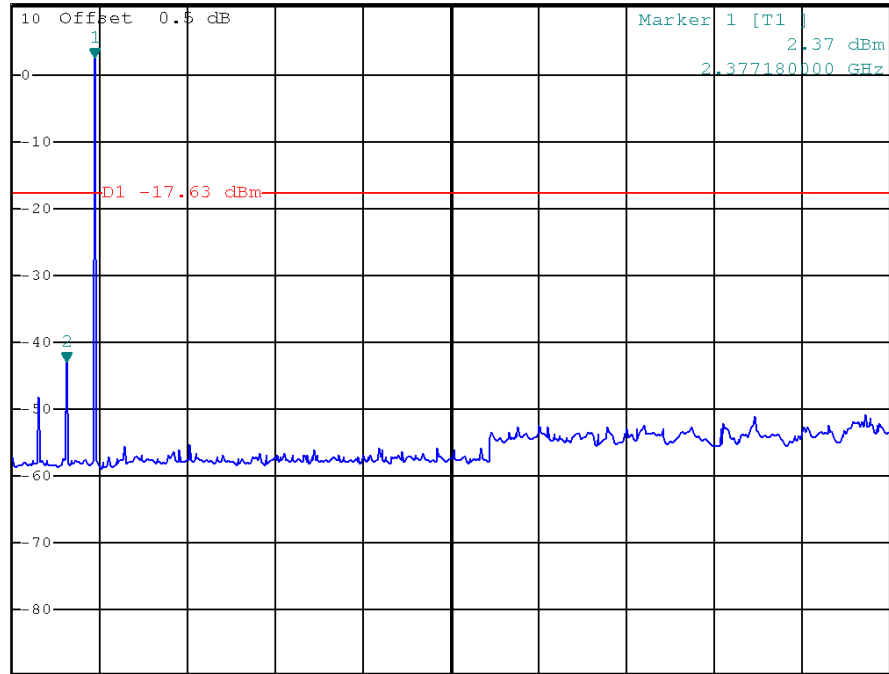
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 s

1.578140000 GHz

1 PK
VIEW



Start 30 MHz

2.497 GHz/

Stop 25 GHz

3 Mbps / CH39-10 Harmonic of the frequency



*RBW 100 kHz Marker 2 [T1]
*VBW 100 kHz -43.61 dBm
SWT 2.5 s 1.628080000 GHz

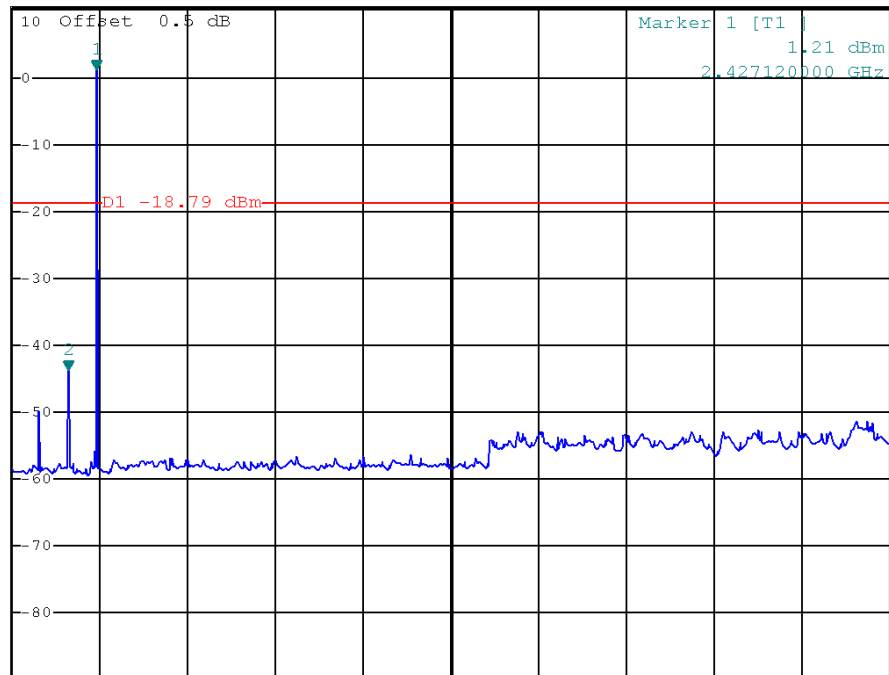
Ref 10.5 dBm

*Att 20 dB

SWT 2.5 s

1.628080000 GHz

1 PK
VIEW



Start 30 MHz

2.497 GHz/

Stop 25 GHz



3 Mbps / CH78-10 Harmonic of the frequency



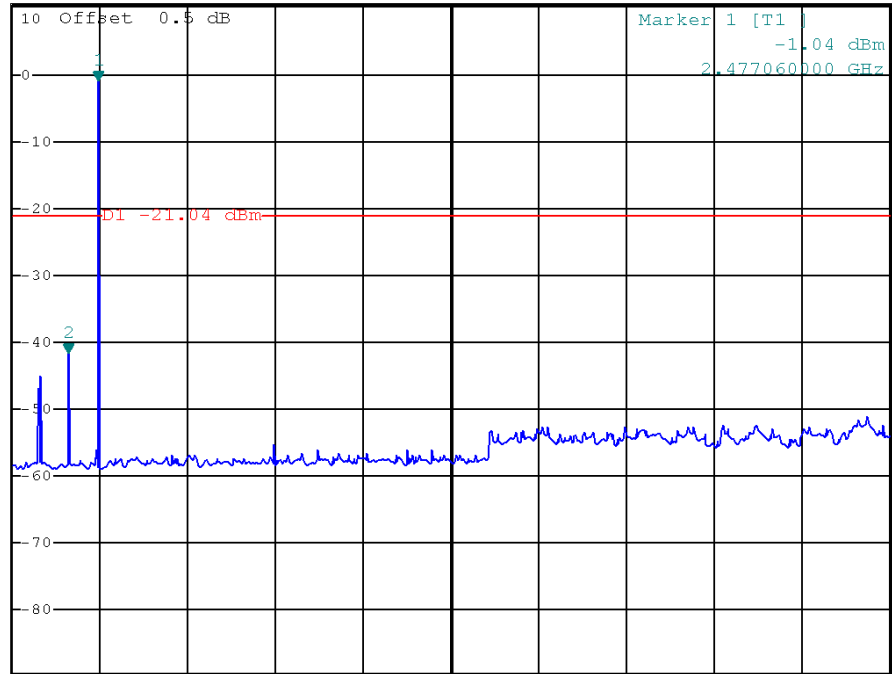
*RBW 100 kHz Marker 2 [T1]
*VBW 100 kHz -41.48 dBm
SWT 2.5 s 1.628080000 GHz

Ref 10.5 dBm

*Att 20 dB

Offset 0.5 dB
Marker 1 [T1]
-1.04 dBm
2.477060000 GHz

1 PK
VIEW



Start 30 MHz

2.497 GHz/

Stop 25 GHz

A

LVL

3DB



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.

(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

10.1.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	Anritsu	ML2487A	6K00004714	Feb. 17, 2012
2	Power Meter Sensor	Anritsu	MA2491A	34138	Feb. 17, 2012

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

10.1.2 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

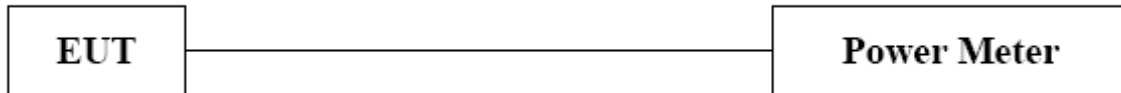
$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



10.1.3 DEVIATION FROM STANDARD

No deviation.

10.1.4 TEST SETUP



10.1.5 EUT OPERATION CONDITIONS

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



Report No.: NEI-FCCP-1-1112114