FCC RADIO TEST REPORT

Applicant	:	Ubiquiti Inc.
Address	:	685 Third Avenue, New York, New York 10017, USA
Equipment	:	UniFi G3 Touch Pro
Model No.	:	UTP-G3-Touch-Pro
Trade Name	:	UBIQUITI
FCC ID	:	SWX-UG3TP

I HEREBY CERTIFY THAT :

The sample was received on Aug. 23, 2023 and the testing was completed on Sep. 13, 2023 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Mark Liao / Supervisor

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory

CONTENTS

History of this test report

Report No.	Issued Date	Description
23080247-TRFCC02	Oct. 31, 2023	Original

1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart C §15.247

FCC Rule	. Description of Test	Result
15.203	. Antenna Requirement	PASS
15.207	. AC Power Line Conducted Emission	PASS
15.209 15.205	. Radiated Spurious Emission	PASS
15.247(d)	. Conducted Spurious Emission	PASS
15.247(a)(2)	. 6dB Bandwidth	PASS
15.247(b)	. Maximum Output Power	PASS
15.247(e)	. Power Spectral Density	PASS
2.1091	. Radio Frequency Exposure	PASS

*The lab has reduced the uncertainty risk factor from test equipment, environment and staff technicians which according to the standard on contract. Therefore, the test result will only be determined by standard requirement,measurement uncertainty evaluation is not considered.

2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Operation Frequency Range	BT / BLE: 2400-2483.5MHz 802.11b/g/n: 2400-2483.5MHz 802.11a/n/ac:5150-5250MHz, 5250-5350MHz, 5470-5725MHz, 5725-5850MHz
Center Frequency Range	BT / BLE: 2402-2480MHz 802.11b/g/n: 2412MHz~2462MHz 802.11a/n/ac:5180-5240MHz, 5260-5320MHz, 5500-5720MHz, 5745-5825MHz
Modulation Type	BT: GFSK, π/4-DQPSK, 8DPSK BLE: GFSK WLAN: 2.4GHz: 802.11b: CCK, DQPSK, DBPSK 802.11g/n: BPSK, QPSK, 16QAM, 64QAM 5GHz: 802.11n/a: BPSK, QPSK, 16QAM, 64QAM 802.11ac: BPSK, QPSK, 16QAM, 64QAM, 256QAM
Modulation Technology	FHSS, DTS, DSSS, OFDM
Data Rate	BT: GFSK: 1Mbps, π/4-DQPSK: 2Mbps, 8DPSK: 3Mbps BLE: GFSK: 1Mbps WLAN: 2.4GHz: 802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0 – MCS7, HT20/40 5GHz: 802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0 – MCS7, HT20/40 802.11ac: MCS0 – MCS9, VHT20/40/80
Antenna Type	ANT A :PIFA Antenna ANT B :Chip Antenna
Antenna Gain	2400MHz~2483.5MHz: ANT A :2.5dBi, For BLE 2400MHz~2483.5MHz: ANT B :1.8dBi .For BT / BLE 2400-2483.5MHz: ANT B: 1.8dBi 5150-5250MHz: ANT B: 3.00dBi 5250-5350MHz: ANT B: 3.00dBi 5470-5725MHz: ANT B: 3.00dBi 5725-5850MHz: ANT B: 3.00dBi

Note:
1. EUT support TPC Function.
2. BT and WLAN can simultaneously transmission.
3. EUT support Client Mode without radar detection.
4.For Chip:Nordic+(Chip:nRF5340) Only Support BLE, use ANT A
For Chip:WCN3680 Support BT and BLE and WLAN, use ANT B
5. For more details, please refer to the User's manual of the EUT.

2.2 Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
***00**	**2402**	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	***19**	**2440**	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	***39**	**2480**
12	2426	26	2454	--	--
13	2428	27	2456	--	--

Note: Channels remarked * are selected to perform test.

2.3 Test Mode and Test Software

a. During testing, the interface cables and equipment positions were varied according to ANSI C63.10.
b. The complete test system included Notebook and EUT for RF test.
c. An executive program, ” nRF connect ver. v2.0.3” under Windows OS system was executed to transmit and receive data via Bluetooth.- For Chip:Nordic
d. An executive program, ” QRCT ver. 4.0.00201.0” under Windows OS system was executed to transmit and receive data via Bluetooth.- For Chip:WCN3680
e. The following test modes were performed for the test:

Conducted Emissions from the AC mains power ports	
Test Mode	Operating Description
1	GFSK (1Mbps), Power from PoE, For Chip:Nordic
2	GFSK (1Mbps), Power from PoE, For Chip:WCN3680
caused “Test Mode 1,2” generated the worst case, it was reported as the final data.	
Radiation Emissions (BELOW 1G)	
Test Mode	Operating Description
1	GFSK (1Mbps), Power from PoE, For Chip:Nordic
2	GFSK (1Mbps), Power from PoE, For Chip:WCN3680
caused “Test Mode 1,2” generated the worst case, it was reported as the final data.	
Radiation Emissions (1GHz ~ 25GHz)	
Test Mode	Operating Description
1	GFSK (1Mbps), Power from PoE, For Chip:Nordic
2	GFSK (1Mbps), Power from PoE, For Chip:WCN3680
caused “Test Mode 1,2” generated the worst case, they were reported as the final data.	

1. There are two kinds of test voltage: AC 120V / 60Hz and AC 240V / 60Hz.
AC Power Line Conducted Emission &Radiated Spurious Emission(BELOW 1G)
AC 120V / 60Hz is worst case.

Modulation Type	TX CONFIGURATION
GFSK (1Mbps)	1TX

2.4 Description of Test System

For Chip:Nordic

RF Conducted				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	lenovo	S1GL2W	N/A	Adapter / 1.8m / NS
3 Prong AC Power Cable	UI	NEMA5	0.6m / NS	N/A
POE	UBIQUITI	GP-H480-050G	N/A	0.6m / NS
RJ45 Cable	TE CONNECTIVITY	CAT5E	1.2m / NS	N/A
Micro USB(Blue)	kolin	KEX-DLCP07	1m / NS	N/A
Radiated Emissions				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
POE	UBIQUITI	GP-H480-050G	N/A	N/A
3 Prong AC Power Cable	UI	NEMA5	0.6m / NS	N/A
RJ45 Cable	TE CONNECTIVITY	CAT5E	1.2m / NS	N/A
Micro USB(Blue)	kolin	KEX-DLCP07	1m / NS	N/A
Notebook	lenovo	S1GL2W	N/A	Adapter / 1.8m / NS
Testfixture	UBIQUITI	11-03875-02	N/A	N/A
AC Power Line Conducted Emission				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	lenovo	S1GL2W	N/A	Adapter / 1.8m / NS
POE	UBIQUITI	GP-H480-050G	N/A	0.6m / NS
3 Prong AC Power Cable	UI	NEMA5	0.6m / NS	N/A
RJ45 Cable	TE CONNECTIVITY	CAT5E	1.2m / NS	N/A
Micro USB(Blue)	kolin	KEX-DLCP07	1m / NS	N/A
Testfixture	UBIQUITI	11-03875-02	N/A	N/A

For Chip:WCN3680

RF Conducted				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	lenovo	S1GL2W	N/A	Adapter / 1.8m / NS
POE	UBIQUITI	GP-H480-050G	N/A	0.6m / NS
3 Prong AC Power Cable	UI	NEMA5	0.6m / NS	N/A
RJ45 Cable	TE CONNECTIVITY	CAT5E	1.2m / NS	N/A
Micro USB(Blue)	kolin	KEX-DLCP07	1m / NS	N/A
Radiated Emissions				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	lenovo	S1GL2W	N/A	Adapter / 1.8m / NS
3 Prong AC Power Cable	UI	NEMA5	0.6m / NS	N/A
POE	UBIQUITI	GP-H480-050G	N/A	0.6m / NS
RJ45 Cable	TE CONNECTIVITY	CAT5E	1.2m / NS	N/A
Micro USB(Blue)	kolin	KEX-DLCP07	1m / NS	N/A
AC Power Line Conducted Emission				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	lenovo	S1GL2W	N/A	Adapter / 1.8m / NS
POE	UBIQUITI	GP-H480-050G	N/A	0.6m / NS
3 Prong AC Power Cable	UI	NEMA5	0.6m / NS	N/A
RJ45 Cable	TE CONNECTIVITY	CAT5E	1.2m / NS	N/A
Micro USB(Blue)	kolin	KEX-DLCP07	1m / NS	N/A

2.5 General Information of Test

☒ Test Site	Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel: +886-3-3226-888 Fax: +886-3-3226-881	
	FCC	TW1439, TW1079
	IC	4934E-1, 4934E-2
Frequency Range Investigated	Conducted: from 150kHz to 30 MHz Radiation: from 9 kHz to 25,000MHz	
Test Distance	The test distance of radiated emission from antenna to EUT is 3 M.	

For Chip:Nordic

Test Item	Test Site	Test Period	Environmental Conditions	Tested By
RF Conducted	RFCON01-NK	2023/09/13	27℃ / 53%	Leon Huang

For Chip:WCN3680

Test Item	Test Site	Test Period	Environmental Conditions	Tested By
RF Conducted	RFCON01-NK	2023/9/1~2023/9/13	24.7~27℃ / 46~53%	Leon Huang

For Chip:Nordic & WCN3680

Test Item	Test Site	Test Period	Environmental Conditions	Tested By
Radiated Emissions	3M03-NK	2023/09/02	23℃ / 48%	Leon Huang
		2023/09/08	24℃ / 45%	Leon Huang
AC Power Line Conducted Emission	CON02-NK	2023/09/12	23℃ / 66%	Leon Huang

2.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Item	Uncertainty
AC Power Line Conduction(150K~30MHz)	±3.28dB
Radiated Spurious Emission(9KHz~30MHz)	±3.5dB
Radiated Spurious Emission(30MHz~1GHz)	±5.1dB
Radiated Spurious Emission(1GHz~40GHz)	±5.2dB
Conducted Spurious Emission	±2.1dB
6dB Bandwidth	±5.4%
20dB Bandwidth	±4.4%
Occupied Bandwidth	±4.5%
Peak Output Power(Conducted Power Meter)	±1.1dB
Dwell Time / Deactivation Time	±7.6%
Power Spectral Density	±2.0dB
Duty Cycle	±3.5%

3. Test Equipment and Ancillaries Used for Tests

For Chip:Nordic

Test Item	Radiated Emissions(2023/9/2)				
Test Site	Semi Anechoic Room(3M03-NK)				
Instrument	**Manufacturer**	**Model No**	**Serial No**	**Calibration Date**	**Valid Date**
Bilog Antenna	Sunol	JB1	A020514-2	2023/06/26	2024/06/25
Active Loop Antenna	Schwarzbeck	FMZB 1513	414	2023/02/03	2024/02/02
Horn Antenna	EMCO	3115	31589	2023/03/23	2024/03/22
Horn Antenna	EMCO	3116	31970	2023/03/03	2024/03/02
EMI Receiver	ROHDE & SCHWARZ	ESCI	101402	2023/03/02	2024/03/01
Spectrum Analyzer	ROHDE & SCHWARZ	FSV 40-N	102151	2023/08/16	2024/08/15
Preamplifier	Agilent	8449B	3008A01954	2023/03/08	2024/03/07
Preamplifier	EM Electronics corp.	EM330	60820	2022/11/11	2023/11/10
Cable-1m(30M-1G)	HUBER SUHNER	RG-214	05094M	2022/09/06	2023/09/05
Cable-4m(30M-1G)	HUBER SUHNER	RG-214	02953M	2023/05/08	2024/05/07
Cable-9m(30M-1G)	HUBER SUHNER	RG-214	00402M	2022/09/06	2023/09/05
Cable-6m(9k~300M)	NA	EMC5D-BM-BM-6	130606	2023/03/13	2024/03/12
Cable-1m(1G-26.5G)	HUBER SUHNER	SF126E	589849/126E	2022/11/09	2023/11/08
Cable-3m(10M-26.5G)	HUBER SUHNER	SF126E	587398/126E	2022/10/07	2023/10/06
Cable-8m(10M-26.5G)	HUBER SUHNER	SF126E	587396/126E	2022/10/07	2023/10/06
Cable-0.5m(30M-40G)	HUBER SUHNER	SUCOFLEX 102	28420/2	2023/03/07	2024/03/06
Cable-3m(30M-40G)	HUBER SUHNER	SUCOFLEX 102	MY2608/2	2023/03/07	2024/03/06
High Pass Filter	Warison	WFIL-H3000-18000F-03	WRJ5CFWC2J1	2023/07/03	2024/07/02
Highpass Filter	Warison	WFIL-H7500-18000F	WRQ4BFWC2J1	2023/03/13	2024/03/12
Notch Filter	Warison	WFIL-N5925-7125F-04	WRQ4BFWC4M1	2023/03/13	2024/03/12
E3	AUDIX	v8.2014-8-6	RK-000529	NA	NA

For Chip:Nordic

Test Item	Radiated Emissions(2023/9/8)				
Test Site	Semi Anechoic Room(3M03-NK)				
Instrument	**Manufacturer**	**Model No**	**Serial No**	**Calibration Date**	**Valid Date**
Bilog Antenna	Sunol	JB1	A020514-2	2023/06/26	2024/06/25
Active Loop Antenna	Schwarzbeck	FMZB 1513	414	2023/02/03	2024/02/02
Horn Antenna	EMCO	3115	31589	2023/03/23	2024/03/22
Horn Antenna	EMCO	3116	31970	2023/03/03	2024/03/02
EMI Receiver	ROHDE & SCHWARZ	ESCI	101402	2023/03/02	2024/03/01
Spectrum Analyzer	ROHDE & SCHWARZ	FSV 40-N	102151	2023/08/16	2024/08/15
Preamplifier	Agilent	8449B	3008A01954	2023/03/08	2024/03/07
Preamplifier	EM Electronics corp.	EM330	60820	2022/11/11	2023/11/10
Cable-1m(30M-1G)	HUBER SUHNER	RG-214	05094M	2023/09/04	2024/09/03
Cable-4m(30M-1G)	HUBER SUHNER	RG-214	02953M	2023/05/08	2024/05/07
Cable-9m(30M-1G)	HUBER SUHNER	RG-214	00402M	2023/09/04	2024/09/03
Cable-6m(9k~300M)	NA	EMC5D-BM-BM-6	130606	2023/03/13	2024/03/12
Cable-1m(1G-26.5G)	HUBER SUHNER	SF126E	589849/126E	2022/11/09	2023/11/08
Cable-3m(10M-26.5G)	HUBER SUHNER	SF126E	587398/126E	2022/10/07	2023/10/06
Cable-8m(10M-26.5G)	HUBER SUHNER	SF126E	587396/126E	2022/10/07	2023/10/06
Cable-0.5m(30M-40G)	HUBER SUHNER	SUCOFLEX 102	28420/2	2023/03/07	2024/03/06
Cable-3m(30M-40G)	HUBER SUHNER	SUCOFLEX 102	MY2608/2	2023/03/07	2024/03/06
High Pass Filter	Warison	WFIL-H3000-18000F-03	WRJ5CFWC2J1	2023/07/03	2024/07/02
Highpass Filter	Warison	WFIL-H7500-18000F	WRQ4BFWC2J1	2023/03/13	2024/03/12
Notch Filter	Warison	WFIL-N5925-7125F-04	WRQ4BFWC4M1	2023/03/13	2024/03/12
E3	AUDIX	v8.2014-8-6	RK-000529	NA	NA

Test Item	RF Conducted				
Test Site	RFCON01-NK				
Instrument	**Manufacturer**	**Model No**	**Serial No**	**Calibration Date**	**Valid Date**
CAX Signal Analyzer	KEYSIGHT	N9000B	MY57100339	2022/11/29	2023/11/28
Power Meter	Anritsu	ML2495A	1224005	2023/03/07	2024/03/06
Power Sensor	Anritsu	MA2411B	1207295	2023/03/07	2024/03/06
Attenuator	KEYSIGHT	8491B	MY39250703	2023/03/08	2024/03/07

Test Item	AC Power Line Conducted Emission				
Test Site	CON02-NK				
Instrument	**Manufacturer**	**Model No**	**Serial No**	**Calibration Date**	**Valid Date**
EMI Receiver	ROHDE & SCHWARZ	ESCI	101423	2023/07/05	2024/07/04
TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	102185	2023/08/29	2024/08/28
Cable-4m(9k-3G)	EMEC	RG-223	18274M	2023/07/31	2024/07/30
E3	AUDIX	v8.2014-8-6	RK-000536	NA	NA

4. Antenna Requirements

4.1 Standard Applicable

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

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

4.2 Antenna Construction and Directional Gain

Antenna Type	ANT A :PIFA Antenna ANT B :Chip Antenna
Antenna Gain	2400MHz~2483.5MHz: ANT A :2.5dBi, For BLE 2400MHz~2483.5MHz: ANT B :1.8dBi .For BT / BLE

5. Test of AC Power Line Conducted Emission

5.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.10-2013. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

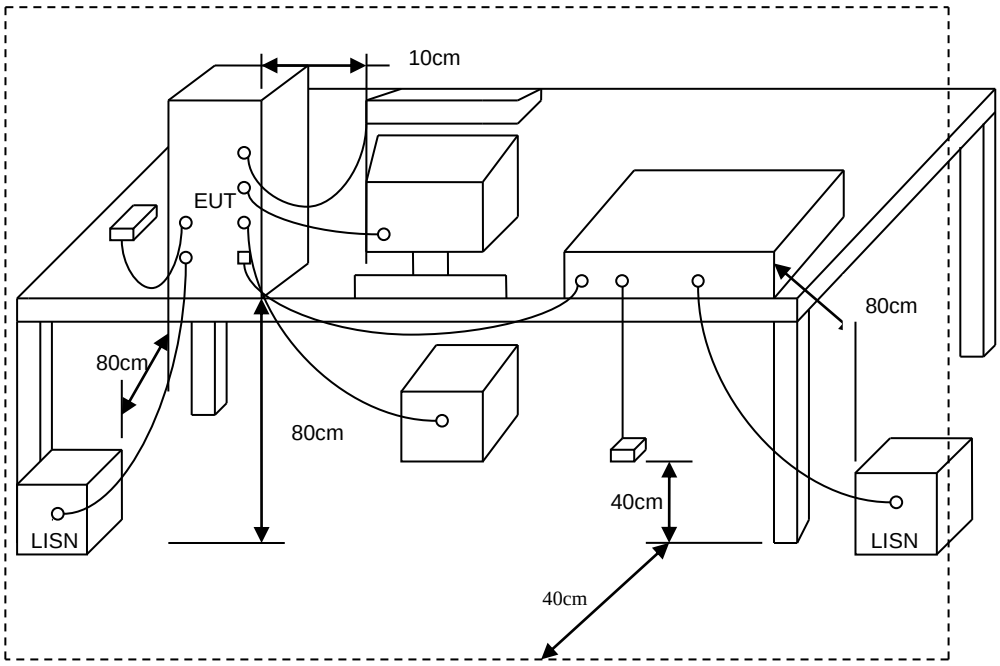
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

*Decreases with the logarithm of the frequency.

5.2 Test Procedures

a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connecting to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 kHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

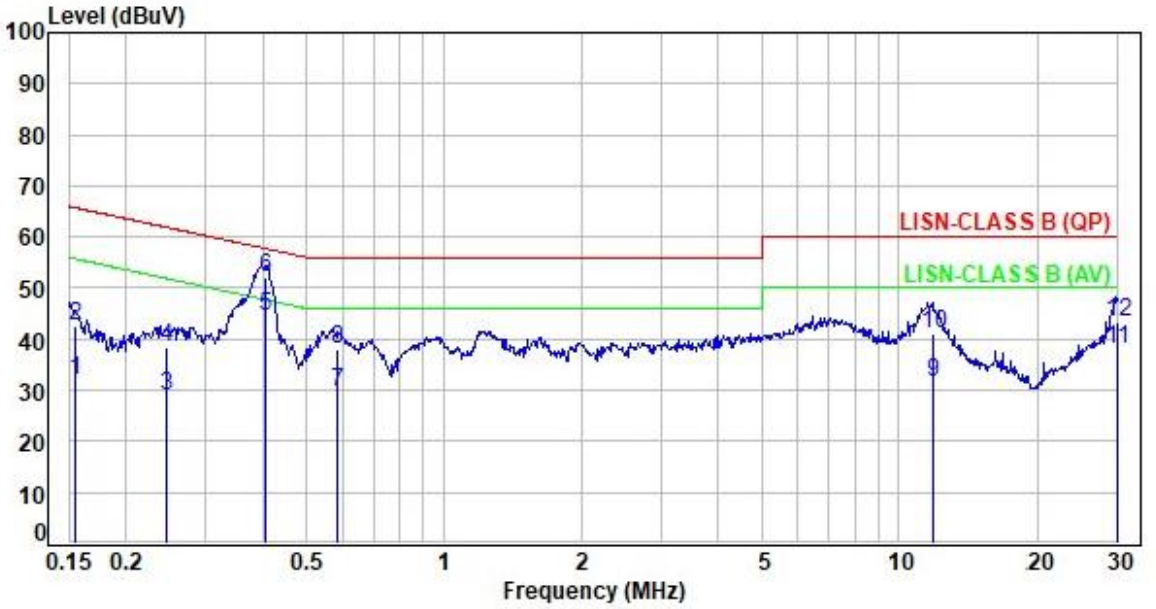
5.3 Typical Test Setup



5.4 Test Result and Data

For Chip:Nordic

Power	:	AC 120V / 60Hz	Pol/Phase	:	LINE
Test Mode	:	Mode 1		:	

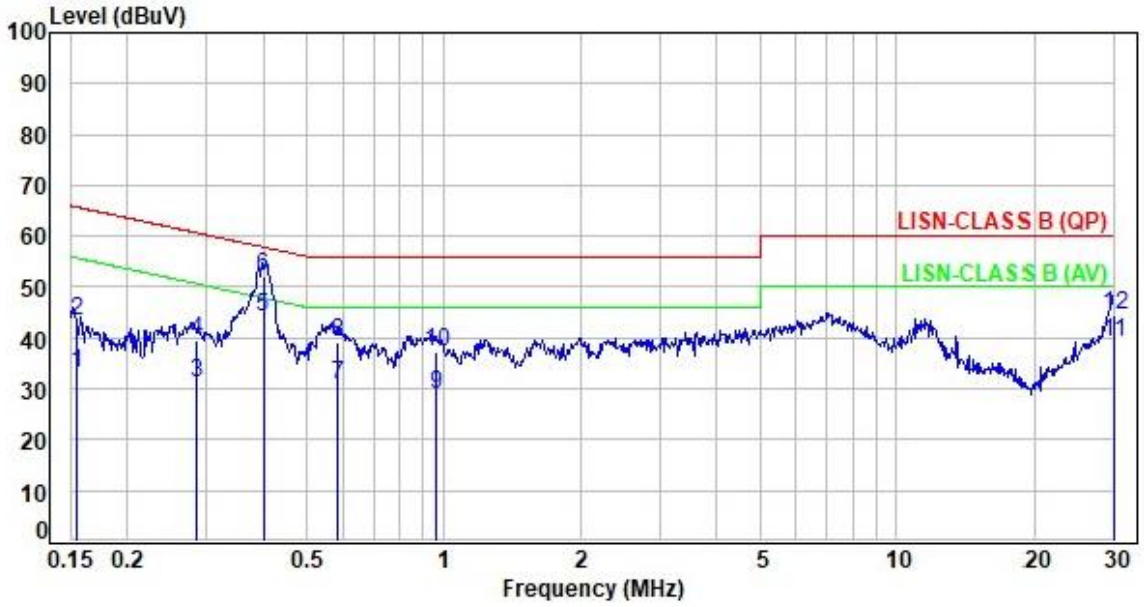


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.15	9.66	22.37	32.03	55.73	-23.70	Average	P
2	0.15	9.66	32.84	42.50	65.73	-23.23	QP	P
3	0.24	9.64	19.17	28.81	51.94	-23.13	Average	P
4	0.24	9.64	28.82	38.46	61.94	-23.48	QP	P
5	0.41	9.66	35.01	44.67	47.73	-3.06	Average	P
6	0.41	9.66	42.60	52.26	57.73	-5.47	QP	P
7	0.58	9.65	19.99	29.64	46.00	-16.36	Average	P
8	0.58	9.65	28.38	38.03	56.00	-17.97	QP	P
9	11.85	9.86	21.63	31.49	50.00	-18.51	Average	P
10	11.85	9.86	31.05	40.91	60.00	-19.09	QP	P
11	29.90	9.95	28.02	37.97	50.00	-12.03	Average	P
12	29.90	9.95	33.45	43.40	60.00	-16.60	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss

For Chip:Nordic

Power	:	AC 120V / 60Hz	Pol/Phase	:	NEUTRAL
Test Mode	:	Mode 1		:	

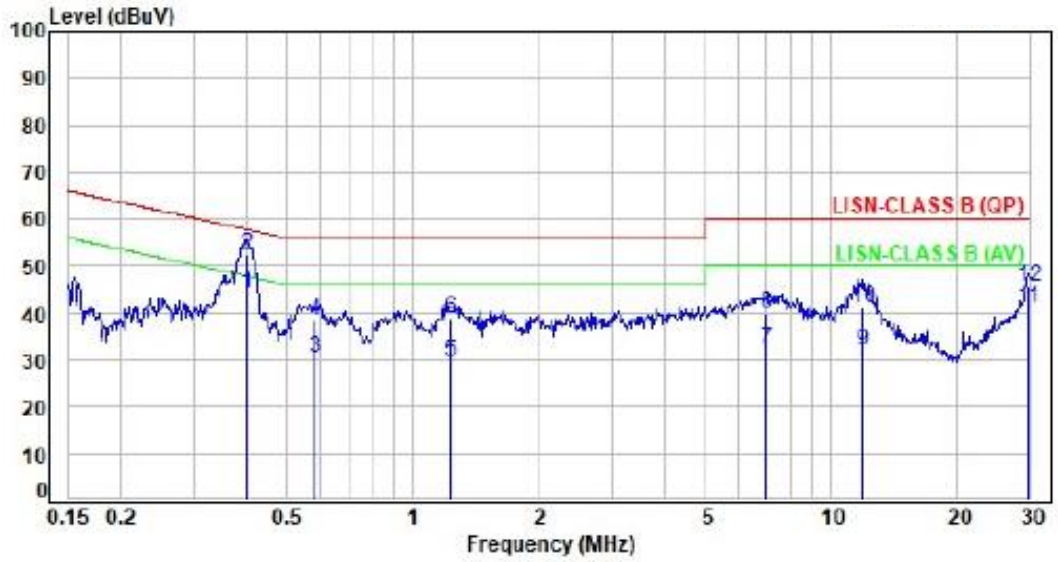


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.16	9.56	23.48	33.04	55.71	-22.67	Average	P
2	0.16	9.56	33.75	43.31	65.71	-22.40	QP	P
3	0.28	9.57	21.45	31.02	50.70	-19.68	Average	P
4	0.28	9.57	29.93	39.50	60.70	-21.20	QP	P
5	0.40	9.57	34.37	43.94	47.86	-3.92	Average	P
6	0.40	9.57	42.34	51.91	57.86	-5.95	QP	P
7	0.58	9.58	21.27	30.85	46.00	-15.15	Average	P
8	0.58	9.58	29.49	39.07	56.00	-16.93	QP	P
9	0.96	9.60	19.30	28.90	46.00	-17.10	Average	P
10	0.96	9.60	27.68	37.28	56.00	-18.72	QP	P
11	29.95	10.09	29.10	39.19	50.00	-10.81	Average	P
12	29.95	10.09	34.43	44.52	60.00	-15.48	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss

For Chip: WCN3680

Power	:	AC 120V / 60Hz	Pol/Phase	:	LINE
Test Mode	:	Mode 2		:	

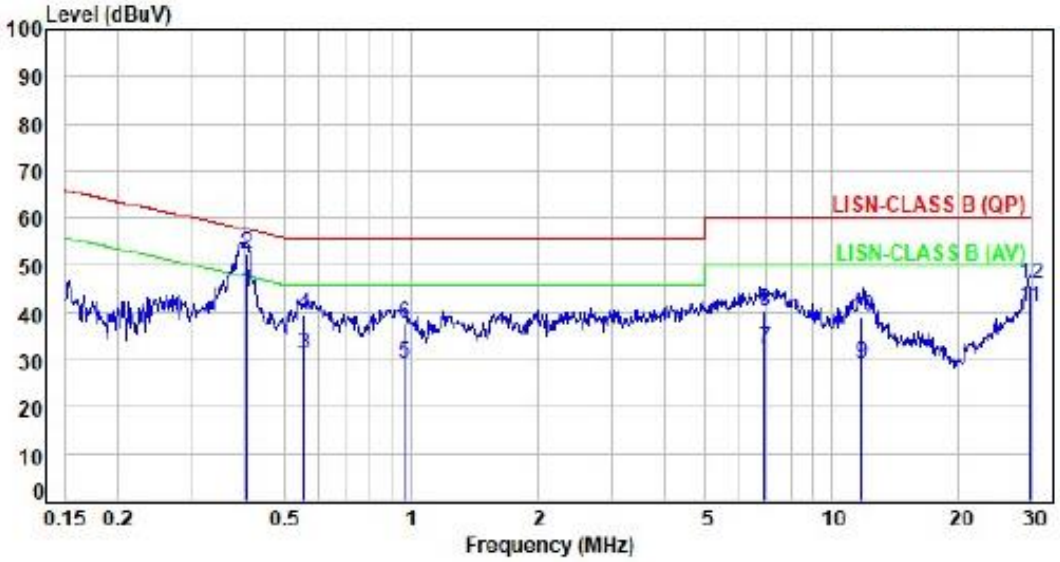


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.40	9.66	34.63	44.29	47.82	-3.53	Average	P
2	0.40	9.66	42.74	52.40	57.82	-5.42	QP	P
3	0.58	9.65	20.64	30.29	46.00	-15.71	Average	P
4	0.58	9.65	28.88	38.53	56.00	-17.47	QP	P
5	1.24	9.66	19.91	29.57	46.00	-16.43	Average	P
6	1.24	9.66	28.95	38.61	56.00	-17.39	QP	P
7	7.03	9.79	22.35	32.14	50.00	-17.86	Average	P
8	7.03	9.79	30.14	39.93	60.00	-20.07	QP	P
9	11.92	9.86	21.97	31.83	50.00	-18.17	Average	P
10	11.92	9.86	31.37	41.23	60.00	-18.77	QP	P
11	29.69	9.95	31.14	41.09	50.00	-8.91	Average	P
12	29.69	9.95	35.73	45.68	60.00	-14.32	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss

For Chip: WCN3680

Power	:	AC 120V / 60Hz	Pol/Phase	:	NEUTRAL
Test Mode	:	Mode 2		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.41	9.57	35.04	44.61	47.74	-3.13	Average	P
2	0.41	9.57	42.85	52.42	57.74	-5.32	QP	P
3	0.55	9.58	21.45	31.03	46.00	-14.97	Average	P
4	0.55	9.58	29.93	39.51	56.00	-16.49	QP	P
5	0.97	9.60	19.55	29.15	46.00	-16.85	Average	P
6	0.97	9.60	28.02	37.62	56.00	-18.38	QP	P
7	6.93	9.76	22.70	32.46	50.00	-17.54	Average	P
8	6.93	9.76	30.72	40.48	60.00	-19.52	QP	P
9	11.79	9.84	19.36	29.20	50.00	-20.80	Average	P
10	11.79	9.84	29.36	39.20	60.00	-20.80	QP	P
11	29.68	10.09	31.01	41.10	50.00	-8.90	Average	P
12	29.68	10.09	35.75	45.84	60.00	-14.16	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss

6. Test of Spurious Emission (Radiated)

6.1 Test Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

Frequency (MHz)	Field Strength (microvolt/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

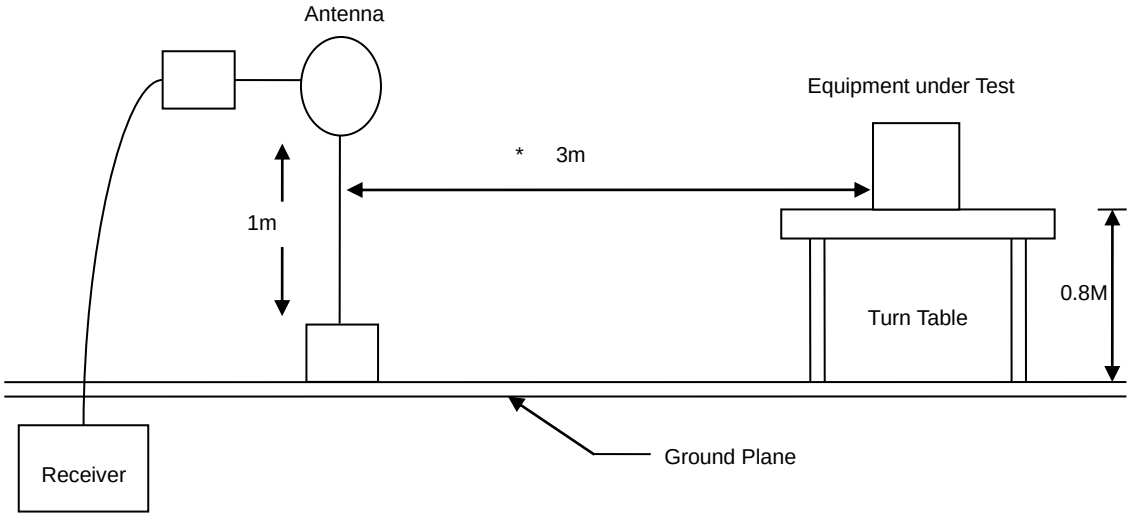
6.2 Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
i. “Cone of radiation” has been considered to be 3dB bandwidth of the measurement antenna.

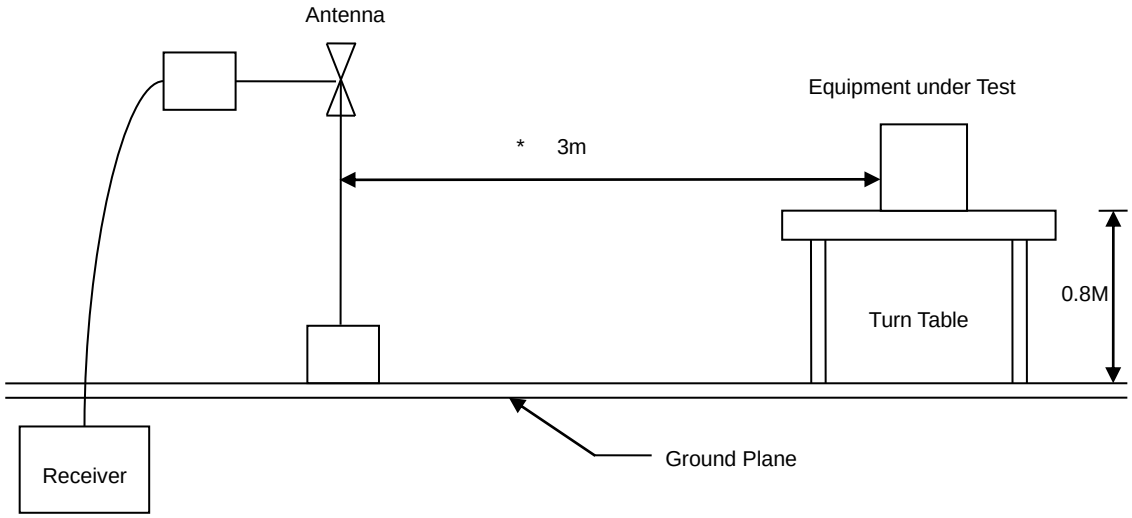
Note:
1.The supporting fixture shall permit orientation of the EUT in each of three orthogonal axis positions such that emissions from the EUT are maximized.
2.Due to the test software function limit the operation band setting(200dBuV/m). There's no corresponding limitation in the actual test item.

6.3 Typical Test Setup

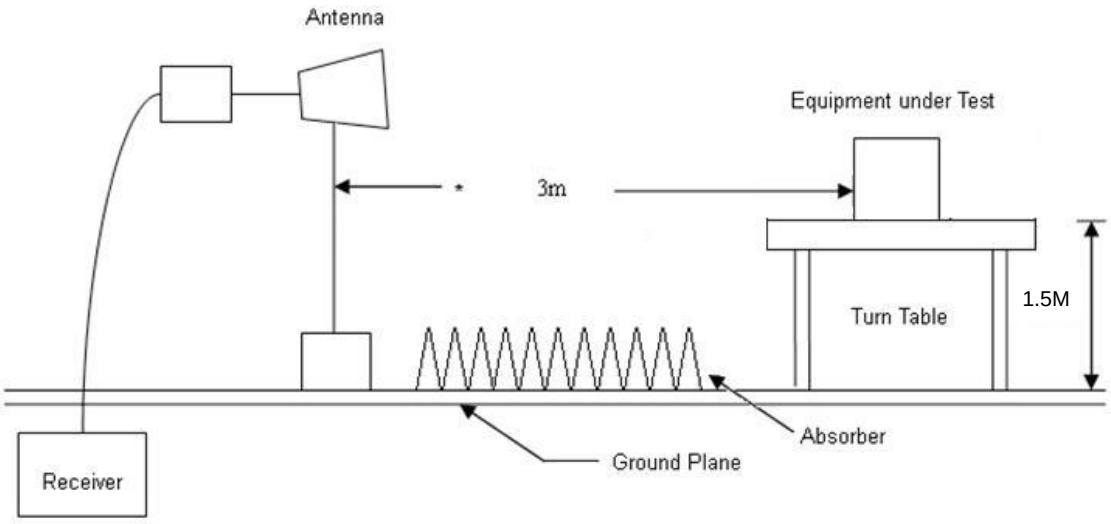
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



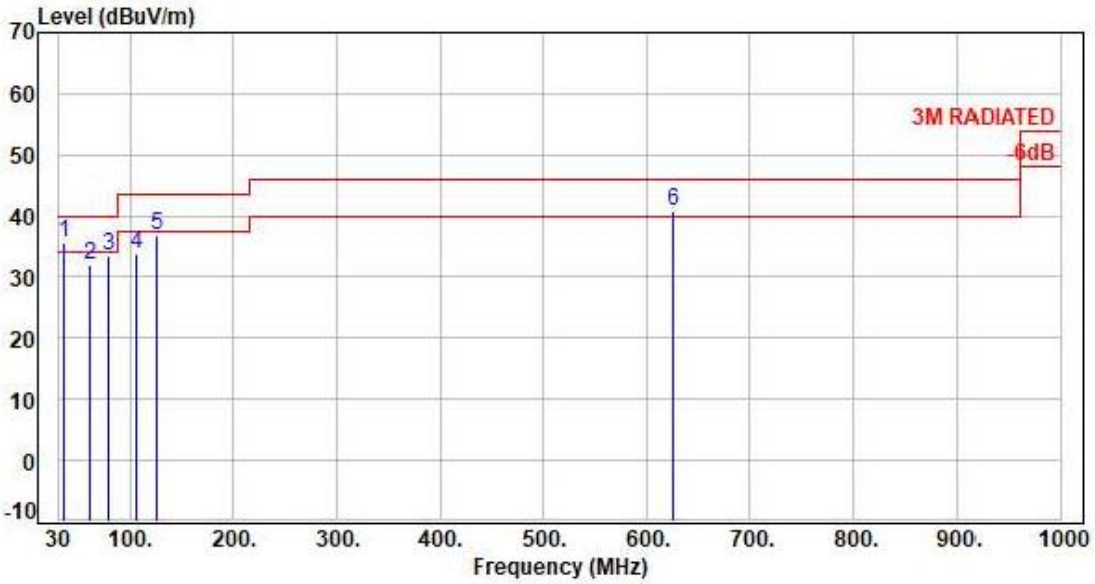
6.4 Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

6.5 Test Result and Data (30MHz ~ 1GHz)

For Chip:Nordic

Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1		:	

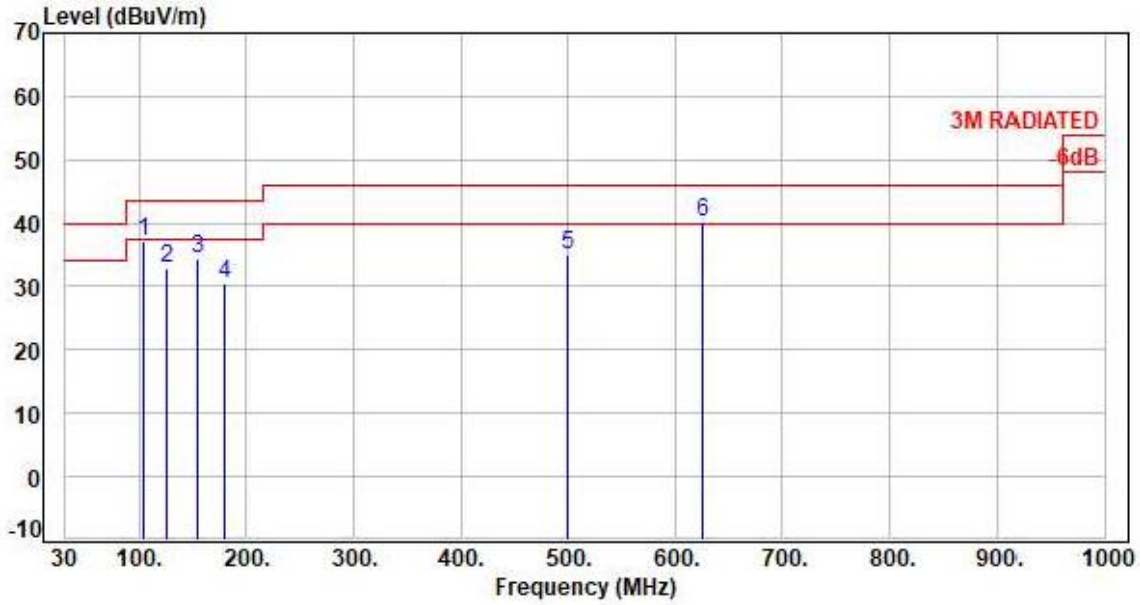


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	35.82	-7.98	43.49	35.51	40.00	-4.49	Peak	400	0	P
2	61.04	-17.22	49.20	31.98	40.00	-8.02	Peak	400	0	P
3	78.50	-17.37	50.79	33.42	40.00	-6.58	Peak	400	0	P
4	105.66	-12.87	46.79	33.92	43.50	-9.58	Peak	400	0	P
5	125.06	-10.68	47.42	36.74	43.50	-6.76	Peak	400	0	P
6	625.58	-2.70	43.47	40.77	46.00	-5.23	Peak	400	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip:Nordic

Power	:	AC 120V / 60Hz	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 1		:	

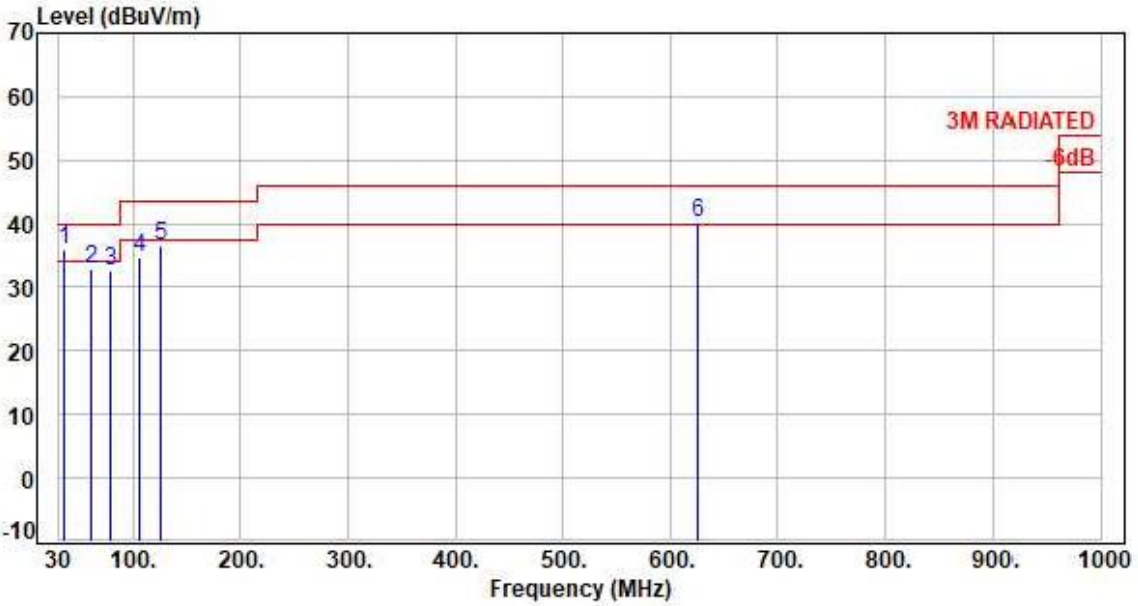


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	103.72	-13.29	50.49	37.20	43.50	-6.30	Peak	100	0	P
2	125.06	-10.68	43.50	32.82	43.50	-10.68	Peak	100	0	P
3	154.16	-12.27	46.72	34.45	43.50	-9.05	Peak	100	0	P
4	179.38	-12.91	43.47	30.56	43.50	-12.94	Peak	100	0	P
5	499.48	-4.97	39.89	34.92	46.00	-11.08	Peak	100	0	P
6	625.58	-2.70	42.88	40.18	46.00	-5.82	Peak	100	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip: WCN3680

Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 2		:	

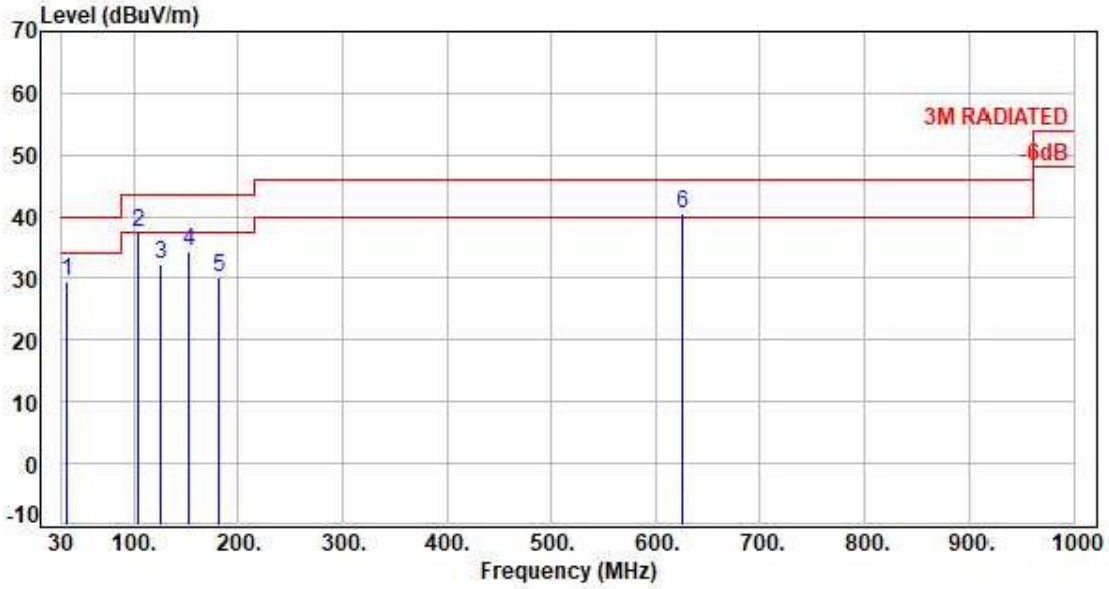


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	35.82	-7.98	43.79	35.81	40.00	-4.19	Peak	400	0	P
2	61.04	-17.22	49.99	32.77	40.00	-7.23	Peak	400	0	P
3	79.47	-17.36	49.99	32.63	40.00	-7.37	Peak	400	0	P
4	105.66	-12.87	47.45	34.58	43.50	-8.92	Peak	400	0	P
5	125.06	-10.68	47.34	36.66	43.50	-6.84	Peak	400	0	P
6	625.58	-2.70	43.04	40.34	46.00	-5.66	Peak	400	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip: WCN3680

Power	:	AC 120V / 60Hz	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 2		:	



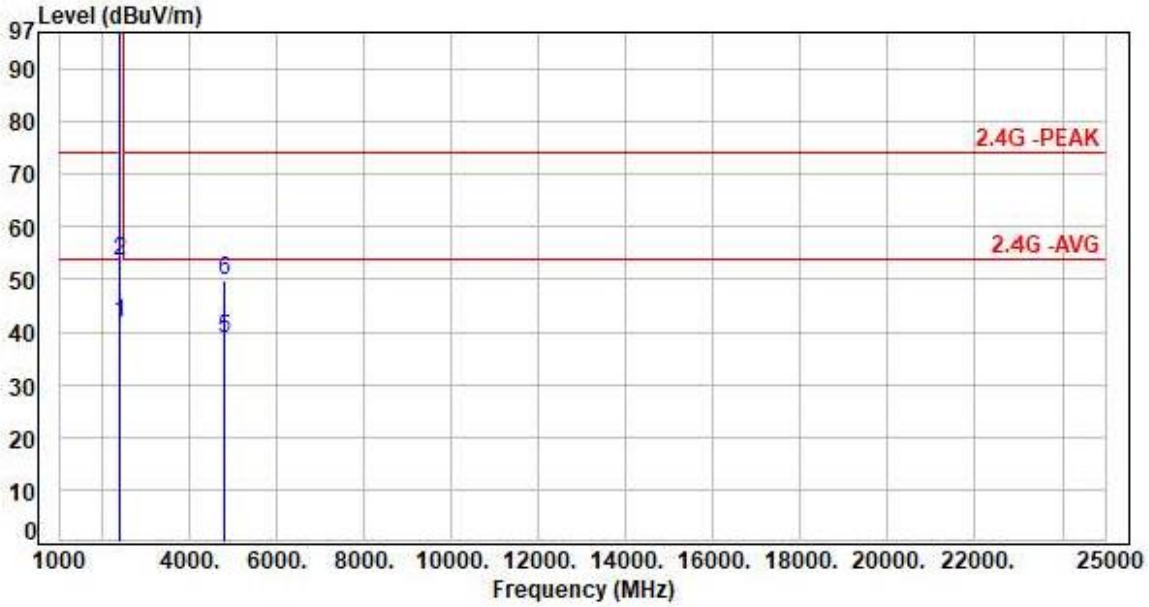
No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	35.82	-7.98	37.55	29.57	40.00	-10.43	Peak	400	0	P
2	103.72	-13.29	50.83	37.54	43.50	-5.96	Peak	400	0	P
3	125.06	-10.68	43.10	32.42	43.50	-11.08	Peak	400	0	P
4	152.22	-12.16	46.54	34.38	43.50	-9.12	Peak	400	0	P
5	181.32	-13.04	43.17	30.13	43.50	-13.37	Peak	400	0	P
6	625.58	-2.70	43.05	40.35	46.00	-5.65	Peak	400	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

6.1 Test Result and Data (1GHz ~ 25GHz)

For Chip:Nordic

Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1, CH00		:	

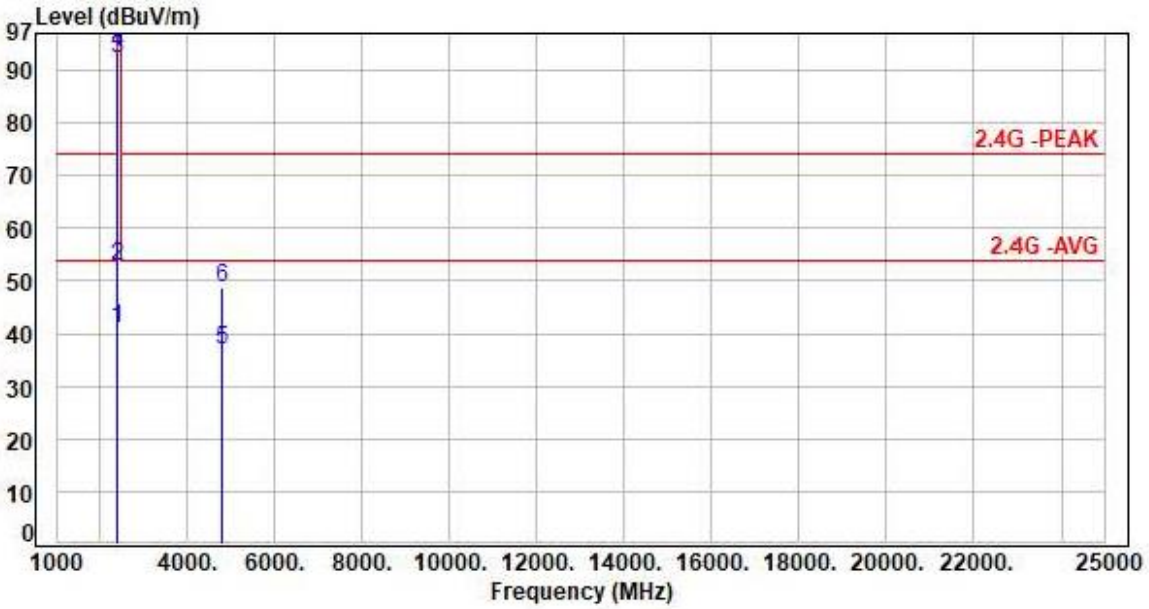


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.05	44.57	41.52	54.00	-12.48	Average	377	360	P
2	2390.00	-3.05	56.53	53.48	74.00	-20.52	Peak	377	360	P
3	2402.00	-3.12	99.46	96.34	200.00	-103.66	Average	377	360	P
4	2402.00	-3.12	100.55	97.43	200.00	-102.57	Peak	377	360	P
5	4804.00	4.68	34.11	38.79	54.00	-15.21	Average	100	333	P
6	4804.00	4.68	45.02	49.70	74.00	-24.30	Peak	100	333	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip:Nordic

Power	:	AC 120V / 60Hz	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 1, CH00		:	

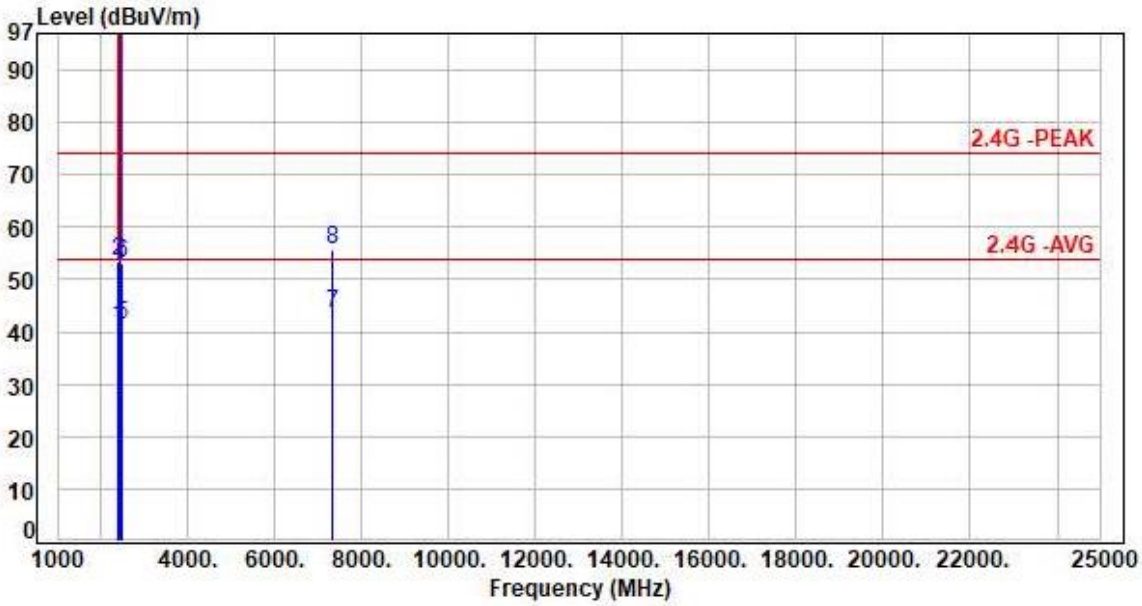


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.05	43.96	40.91	54.00	-13.09	Average	100	154	P
2	2390.00	-3.05	55.93	52.88	74.00	-21.12	Peak	100	154	P
3	2402.00	-3.12	95.37	92.25	200.00	-107.75	Average	100	154	P
4	2402.00	-3.12	96.45	93.33	200.00	-106.67	Peak	100	154	P
5	4804.00	4.68	32.21	36.89	54.00	-17.11	Average	100	85	P
6	4804.00	4.68	43.94	48.62	74.00	-25.38	Peak	100	85	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip:Nordic

Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1, CH19		:	

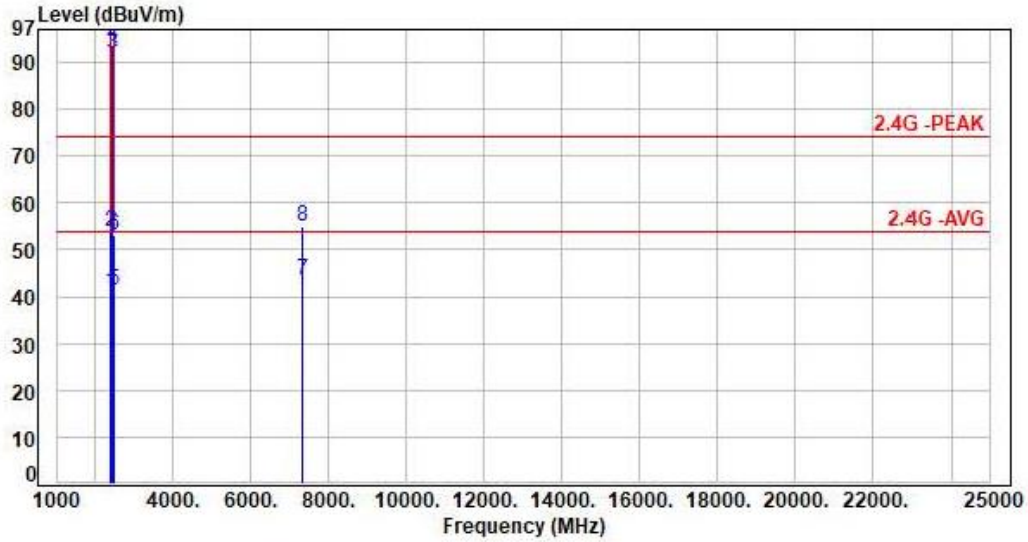


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.05	43.84	40.79	54.00	-13.21	Average	340	360	P
2	2390.00	-3.05	56.48	53.43	74.00	-20.57	Peak	340	360	P
3	2440.00	-3.00	99.94	96.94	200.00	-103.06	Average	340	360	P
4	2440.00	-3.00	101.48	98.48	200.00	-101.52	Peak	340	360	P
5	2483.50	-2.92	44.25	41.33	54.00	-12.67	Average	340	360	P
6	2483.50	-2.92	55.92	53.00	74.00	-21.00	Peak	340	360	P
7	7320.00	9.97	33.57	43.54	54.00	-10.46	Average	100	107	P
8	7320.00	9.97	45.60	55.57	74.00	-18.43	Peak	100	107	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip:Nordic

Power	:	AC 120V / 60Hz	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 1, CH19		:	

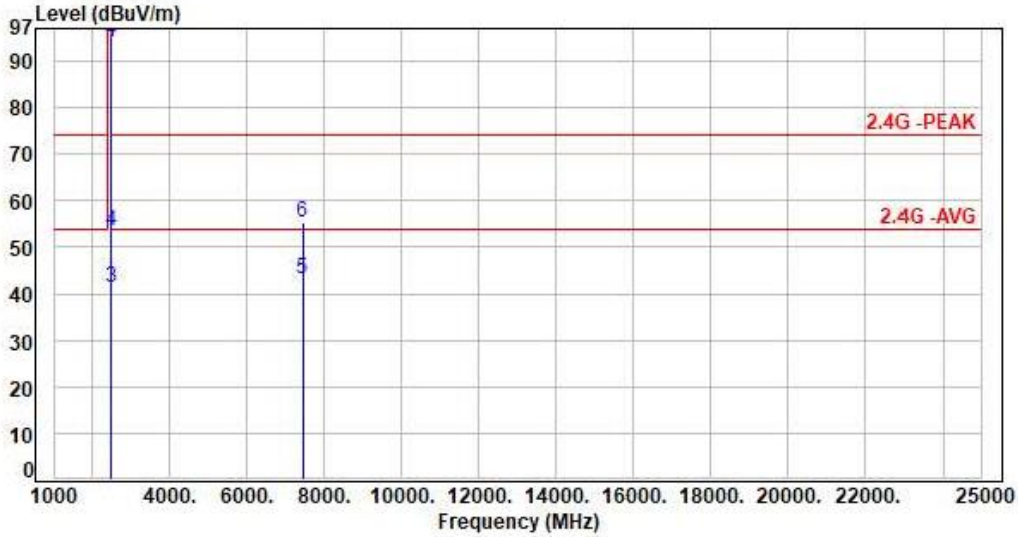


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.05	44.17	41.12	54.00	-12.88	Average	103	143	P
2	2390.00	-3.05	56.81	53.76	74.00	-20.24	Peak	103	143	P
3	2440.00	-3.00	94.71	91.71	200.00	-108.29	Average	103	143	P
4	2440.00	-3.00	96.74	93.74	200.00	-106.26	Peak	103	143	P
5	2483.50	-2.92	44.31	41.39	54.00	-12.61	Average	103	143	P
6	2483.50	-2.92	56.11	53.19	74.00	-20.81	Peak	103	143	P
7	7320.00	9.97	33.51	43.48	54.00	-10.52	Average	100	161	P
8	7320.00	9.97	45.03	55.00	74.00	-19.00	Peak	100	161	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip:Nordic

Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1, CH39		:	

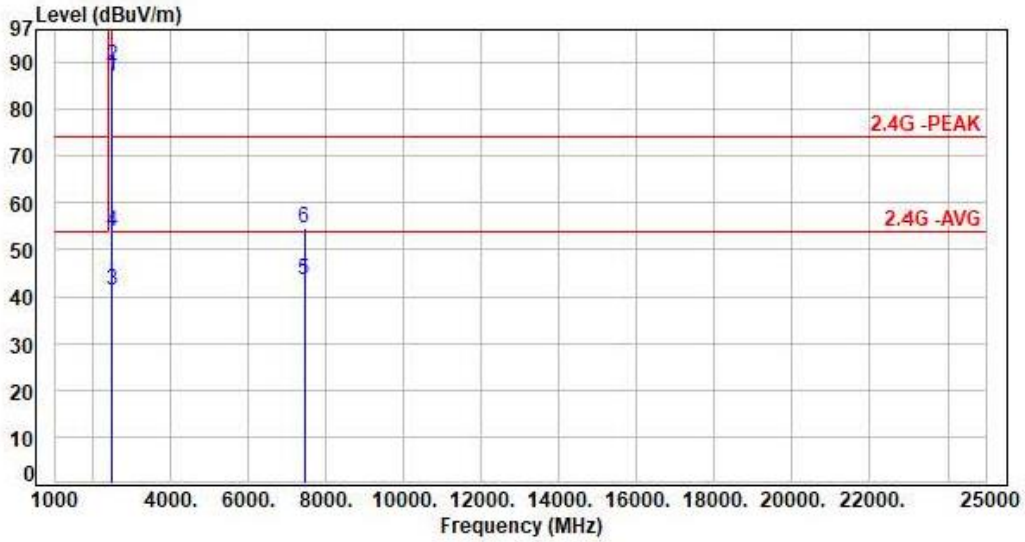


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2480.00	-2.96	96.95	93.99	200.00	-106.01	Average	337	360	P
2	2480.00	-2.96	98.25	95.29	200.00	-104.71	Peak	337	360	P
3	2483.50	-2.92	44.26	41.34	54.00	-12.66	Average	337	360	P
4	2483.50	-2.92	56.49	53.57	74.00	-20.43	Peak	337	360	P
5	7440.00	10.17	33.16	43.33	54.00	-10.67	Average	100	110	P
6	7440.00	10.17	45.07	55.24	74.00	-18.76	Peak	100	110	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip:Nordic

Power	:	AC 120V / 60Hz	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 1, CH39		:	

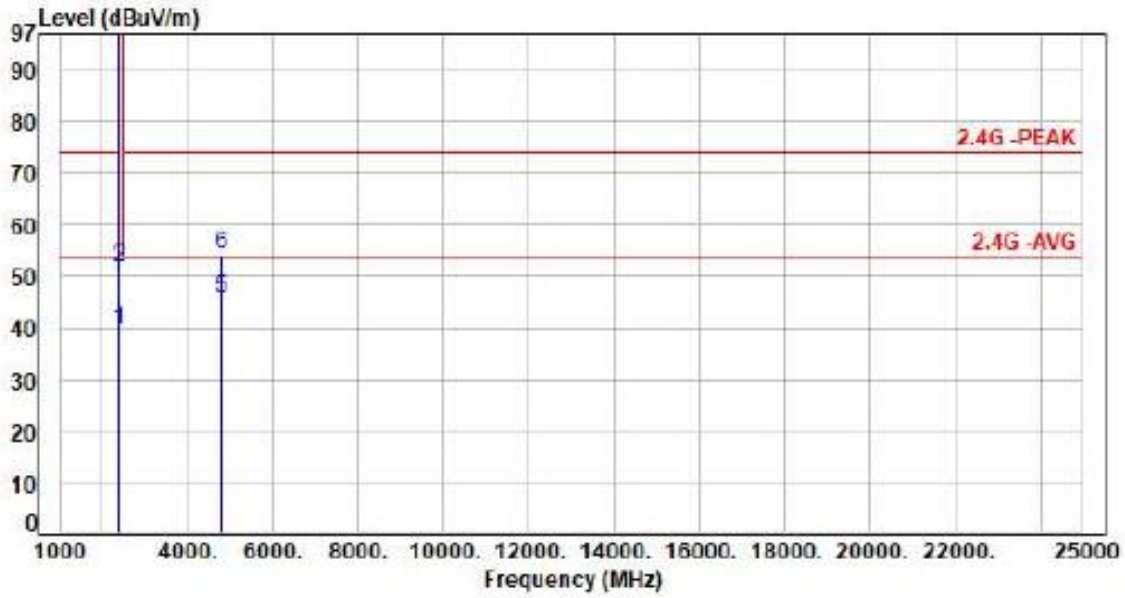


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2480.00	-2.96	90.12	87.16	200.00	-112.84	Average	103	146	P
2	2480.00	-2.96	92.17	89.21	200.00	-110.79	Peak	103	146	P
3	2483.50	-2.92	44.39	41.47	54.00	-12.53	Average	103	146	P
4	2483.50	-2.92	56.63	53.71	74.00	-20.29	Peak	103	146	P
5	7440.00	10.17	33.48	43.65	54.00	-10.35	Average	100	165	P
6	7440.00	10.17	44.54	54.71	74.00	-19.29	Peak	100	165	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip: WCN3680

Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 2, CH00		:	

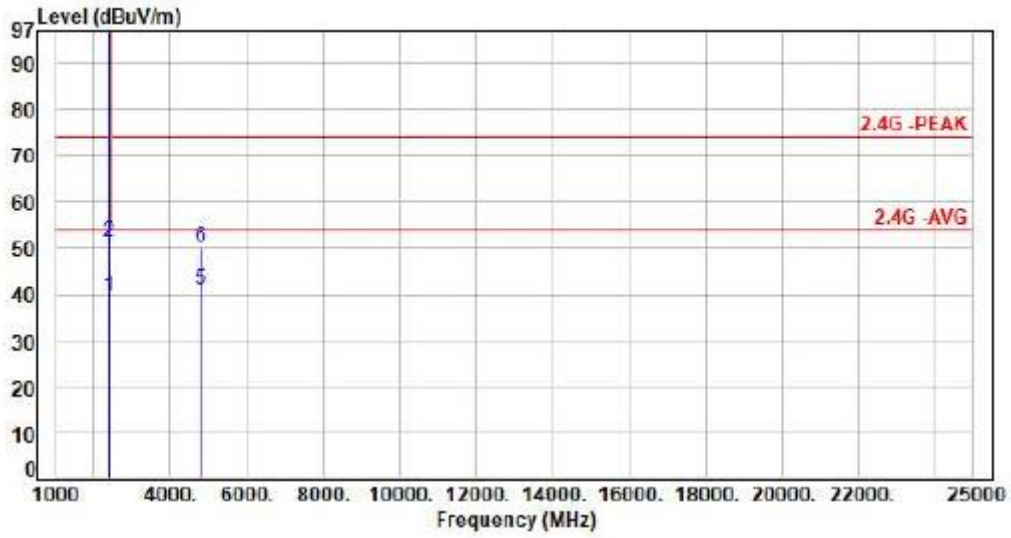


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.05	42.66	39.61	54.00	-14.39	Average	173	198	P
2	2390.00	-3.05	54.56	51.51	74.00	-22.49	Peak	173	198	P
3	2402.00	-3.12	107.69	104.57	200.00	-95.43	Average	173	198	P
4	2402.00	-3.12	110.65	107.53	200.00	-92.47	Peak	173	198	P
5	4804.00	4.68	41.05	45.73	54.00	-8.27	Average	118	201	P
6	4804.00	4.68	49.60	54.28	74.00	-19.72	Peak	118	201	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip: WCN3680

Power	:	AC 120V / 60Hz	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 2, CH00		:	

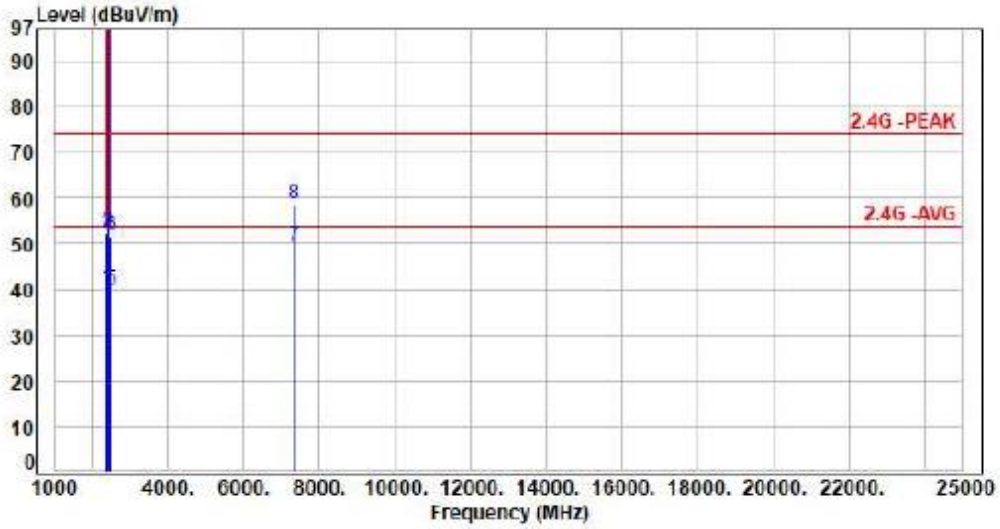


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.05	42.47	39.42	54.00	-14.58	Average	100	212	P
2	2390.00	-3.05	54.44	51.39	74.00	-22.61	Peak	100	212	P
3	2402.00	-3.12	105.82	102.70	200.00	-97.30	Average	100	212	P
4	2402.00	-3.12	108.14	105.02	200.00	-94.98	Peak	100	212	P
5	4804.00	4.68	36.20	40.88	54.00	-13.12	Average	184	230	P
6	4804.00	4.68	45.40	50.08	74.00	-23.92	Peak	184	230	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip: WCN3680

Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 2, CH19		:	

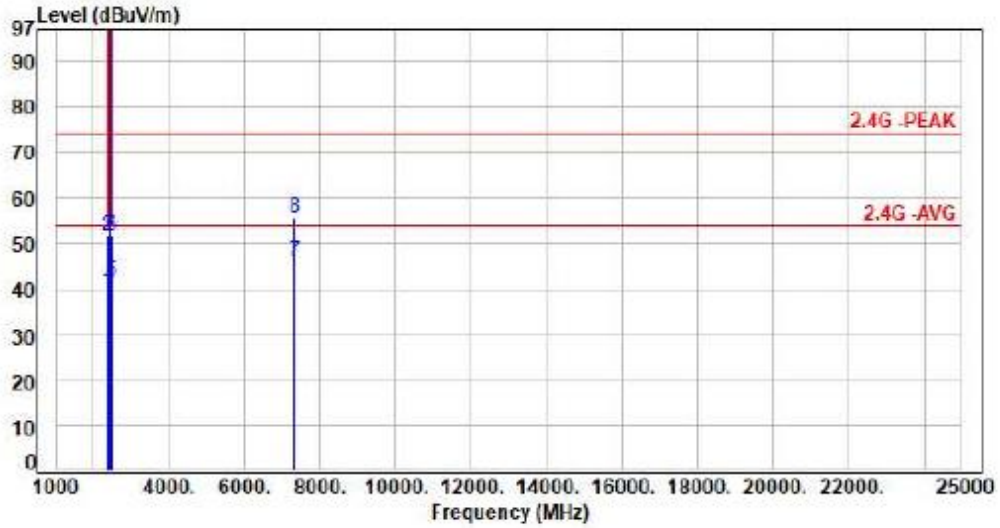


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.05	43.20	40.15	54.00	-13.85	Average	142	192	P
2	2390.00	-3.05	55.27	52.22	74.00	-21.78	Peak	142	192	P
3	2440.00	-3.00	104.74	101.74	200.00	-98.26	Average	142	192	P
4	2440.00	-3.00	105.87	102.87	200.00	-97.13	Peak	142	192	P
5	2483.50	-2.92	42.83	39.91	54.00	-14.09	Average	142	192	P
6	2483.50	-2.92	54.71	51.79	74.00	-22.21	Peak	142	192	P
7	7320.00	9.97	39.28	49.25	54.00	-4.75	Average	215	214	P
8	7320.00	9.97	48.72	58.69	74.00	-15.31	Peak	215	214	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip: WCN3680

Power	:	AC 120V / 60Hz	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 2, CH19		:	

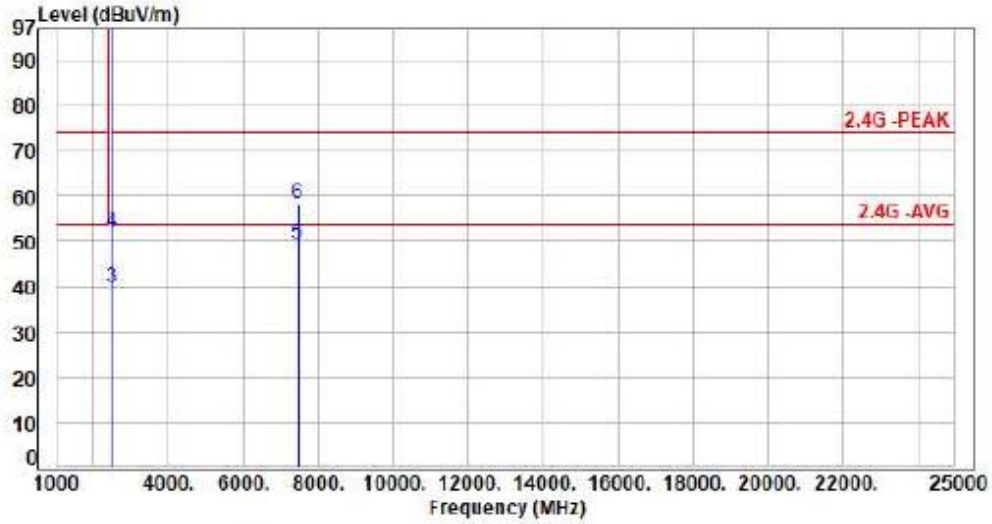


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.05	42.47	39.42	54.00	-14.58	Average	100	213	P
2	2390.00	-3.05	54.81	51.76	74.00	-22.24	Peak	100	213	P
3	2440.00	-3.00	103.44	100.44	200.00	-99.56	Average	100	213	P
4	2440.00	-3.00	104.70	101.70	200.00	-98.30	Peak	100	213	P
5	2483.50	-2.92	44.49	41.57	54.00	-12.43	Average	100	213	P
6	2483.50	-2.92	54.48	51.56	74.00	-22.44	Peak	100	213	P
7	7320.00	9.97	36.28	46.25	54.00	-7.75	Average	100	98	P
8	7320.00	9.97	45.89	55.86	74.00	-18.14	Peak	100	98	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip: WCN3680

Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 2, CH39		:	

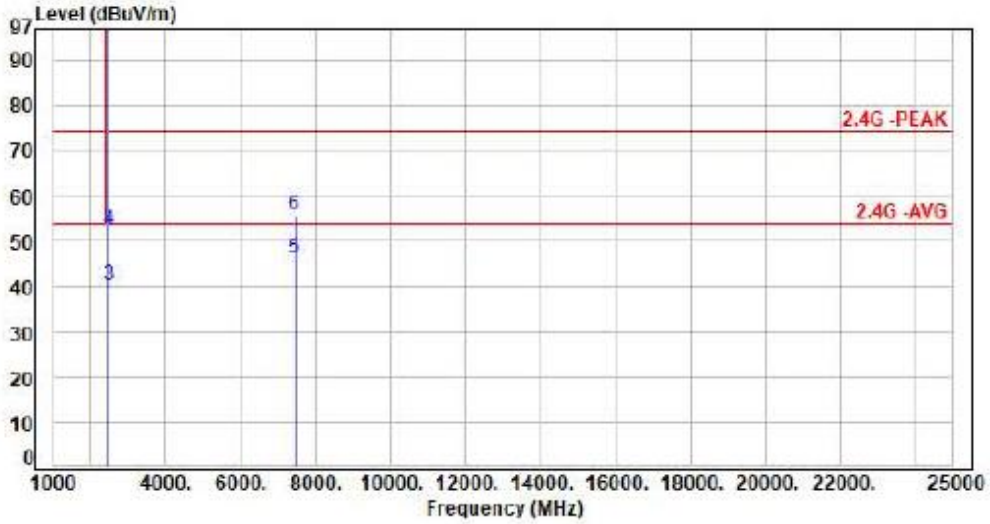


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2480.00	-2.96	104.04	101.08	200.00	-98.92	Average	108	126	P
2	2480.00	-2.96	105.06	102.10	200.00	-97.90	Peak	108	126	P
3	2483.50	-2.92	42.81	39.89	54.00	-14.11	Average	108	126	P
4	2483.50	-2.92	54.96	52.04	74.00	-21.96	Peak	108	126	P
5	7440.00	10.17	39.07	49.24	54.00	-4.76	Average	216	214	P
6	7440.00	10.17	47.93	58.10	74.00	-15.90	Peak	216	214	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

For Chip: WCN3680

Power	:	AC 120V / 60Hz	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 2, CH39		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2480.00	-2.96	104.94	101.98	200.00	-98.02	Average	133	135	P
2	2480.00	-2.96	107.61	104.65	200.00	-95.35	Peak	133	135	P
3	2483.50	-2.92	42.99	40.07	54.00	-13.93	Average	133	135	P
4	2483.50	-2.92	55.47	52.55	74.00	-21.45	Peak	133	135	P
5	7440.00	10.17	35.97	46.14	54.00	-7.86	Average	100	100	P
6	7440.00	10.17	45.47	55.64	74.00	-18.36	Peak	100	100	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

6.2 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

**: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

7. Test of Spurious Emission (Conducted)

7.1 Test Limit

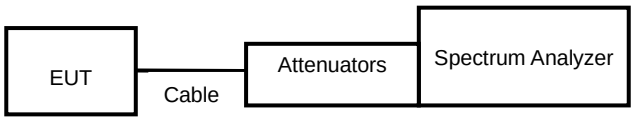
According to the methods defined in ANSI C63.10-2013 Section 11.11.1
Below –30dB of the highest emission level of operating band (In 100 kHz Resolution Bandwidth)

7.2 Test Procedure

According to the methods defined in ANSI C63.10-2013 Section 11.11.2 & 11.11.3

a. The transmitter output was connected to the spectrum analyzer via a low loss cable.
b. Set RBW of spectrum analyzer to 100 KHz and VBW of spectrum analyzer to 300 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
c. Peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 30dB relative to the maximum measured in-band peak PSD level.
d. The band edges was measured and recorded.

7.3 Test Setup Layout

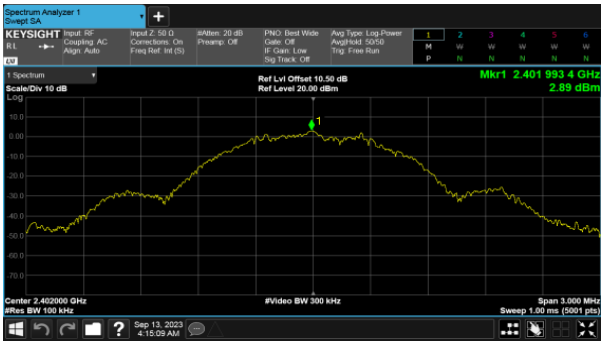


7.4 Test Result and Data

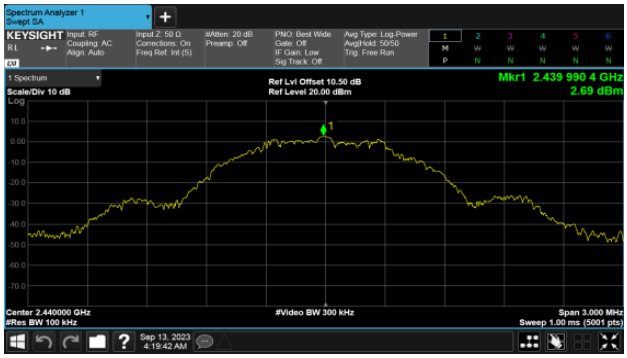
Note: Test plots refer to the following pages.

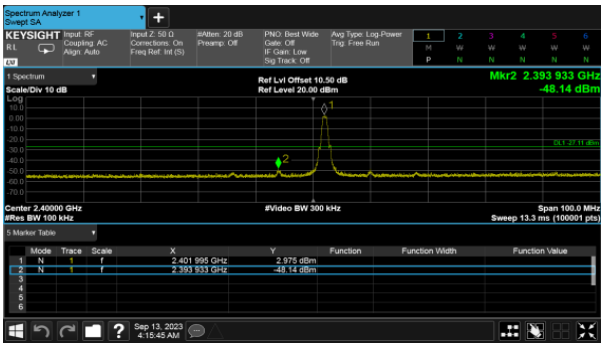
For Chip:Nordic

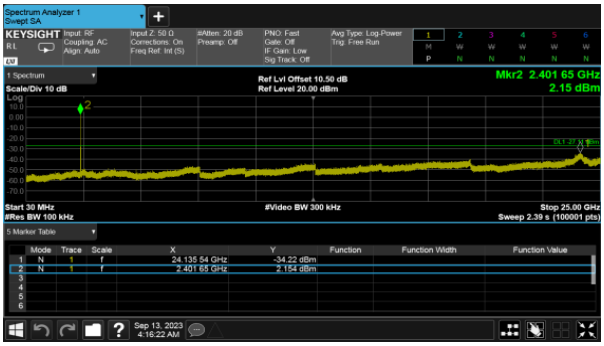
Modulation Type: GFSK(1Mbps)
CH00



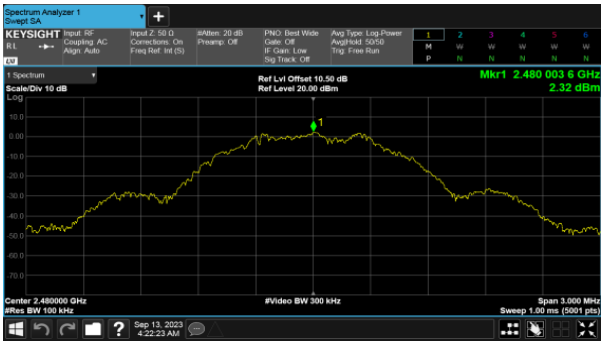
Modulation Type: GFSK(1Mbps)
CH19

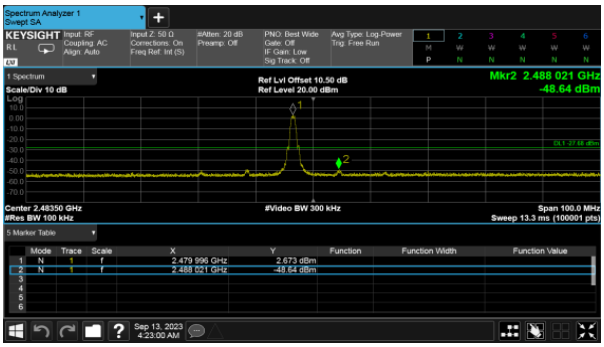


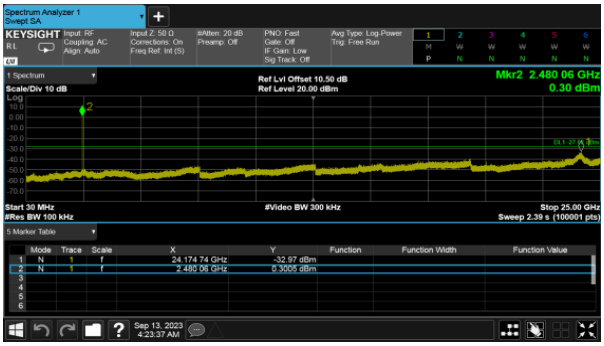




For Chip:Nordic
Modulation Type: GFSK(1Mbps)
CH39

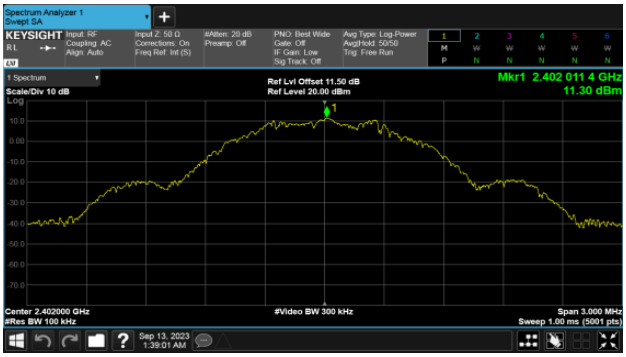




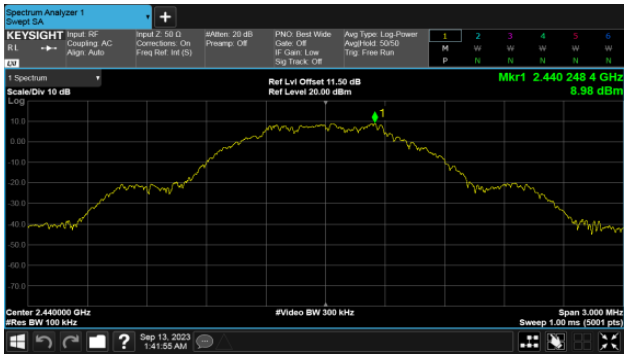


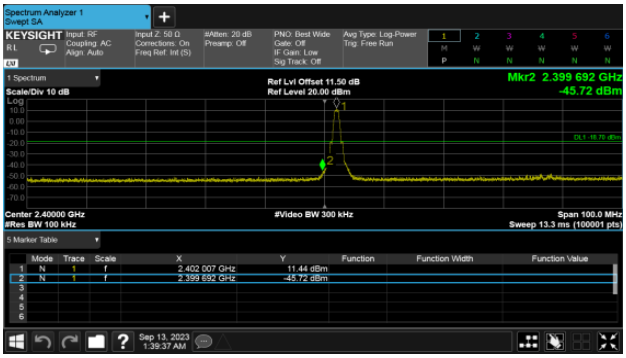
For Chip: WCN3680

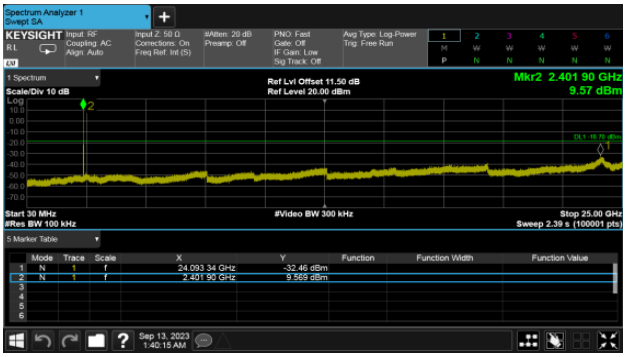
Modulation Type: GFSK(1Mbps)
CH00



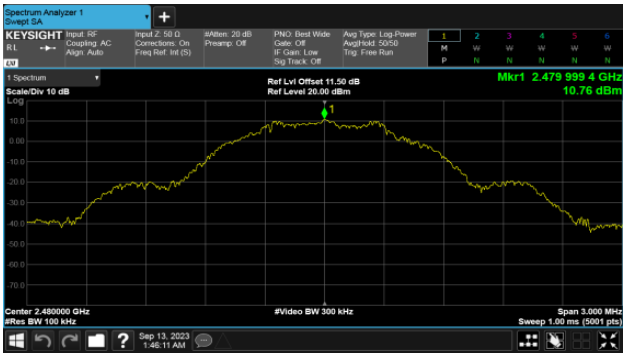
Modulation Type: GFSK(1Mbps)
CH19

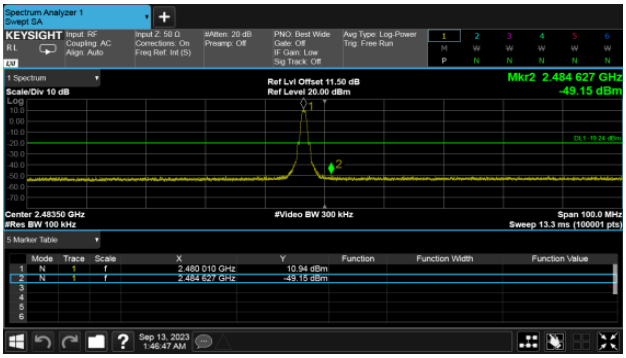






For Chip: WCN3680
Modulation Type: GFSK(1Mbps)
CH39





8. On Time, Duty Cycle and Measurement methods

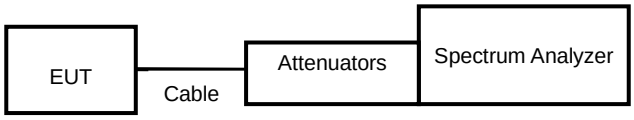
8.1 Test Limit

None; for reporting purposes only.

8.2 Test Procedure

According to the methods defined in ANSI C63.10-2013 Section 11.6 Zero-Span Spectrum Analyzer Method.

8.3 Test Setup Layout



8.4 Test Result and Data

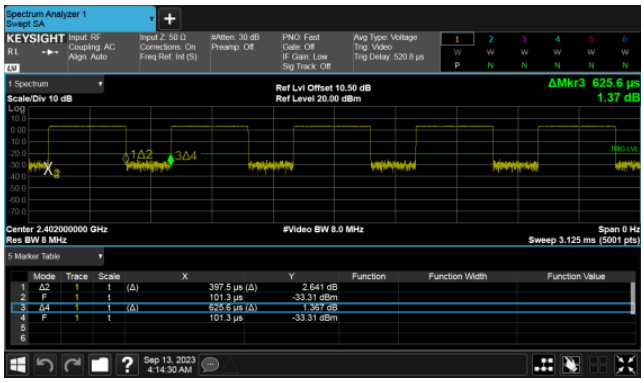
For Chip:Nordic

Modulation Type	On Time (ms)	Period Time (ms)	Duty Cycle (%)
GFSK(1MBps)	0.40	0.63	63.54%

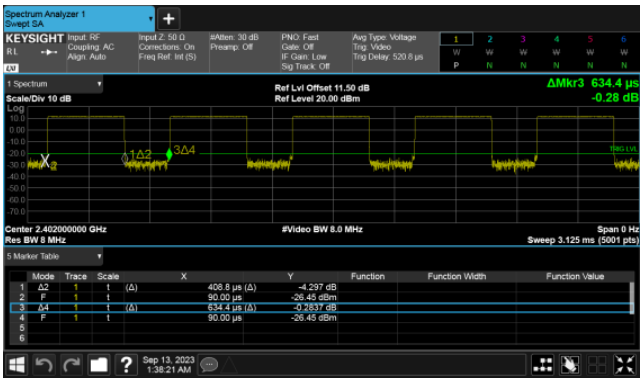
For Chip: WCN3680

Modulation Type	On Time (ms)	Period Time (ms)	Duty Cycle (%)
GFSK(1MBps)	0.41	0.63	64.44%

For Chip:Nordic
Modulation Type: GFSK(1Mbps)



For Chip: WCN3680
Modulation Type: GFSK(1Mbps)



9. 6dB Bandwidth Measurement Data

9.1 Test Limit

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

9.2 Test Procedures

According to the methods defined in ANSI C63.10-2013 Section 11.8

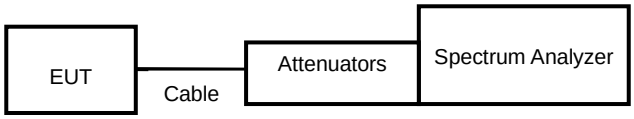
a. The transmitter output was connected to the spectrum analyzer.

b. Set RBW of spectrum analyzer to 100 KHz and VBW to 300 KHz.

c. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

d. The 6dB Bandwidth was measured and recorded.

9.3 Test Setup Layout



9.4 Test Result and Data

For Chip:Nordic

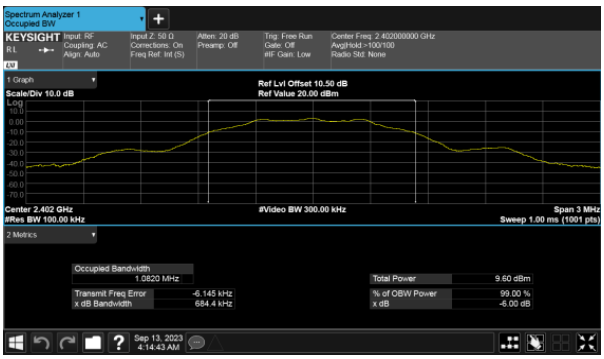
Modulation Type	Channel	Frequency (MHz)	6dB Bandwidth (KHz)	Limit (KHz)
GFSK(1Mbps)	0	2402	684.40	500
	19	2440	685.10	500
	39	2480	684.50	500

For Chip:WCN3680

Modulation Type	Channel	Frequency (MHz)	6dB Bandwidth (KHz)	Limit (KHz)
GFSK(1Mbps)	0	2402	679.60	500
	19	2440	683.80	500
	39	2480	685.10	500

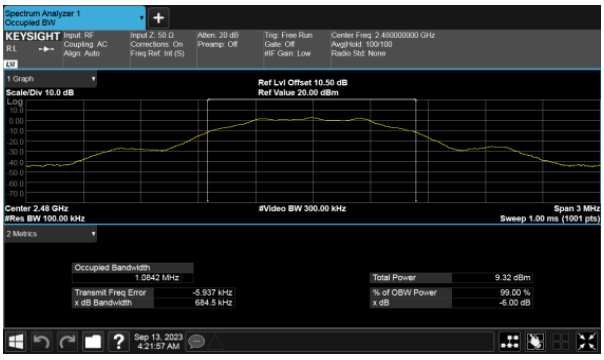
For Chip:Nordic

Modulation Type: GFSK(1Mbps)
CH00



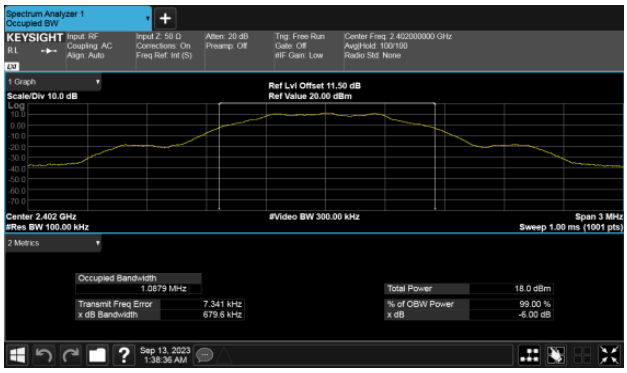
Modulation Type: GFSK(1Mbps)
CH19

Modulation Type: GFSK(1Mbps)
CH39



For Chip: WCN3680

Modulation Type: GFSK(1Mbps)
CH00



Modulation Type: GFSK(1Mbps)
CH19

Modulation Type: GFSK(1Mbps)
CH39

10. Maximum Average Output Power

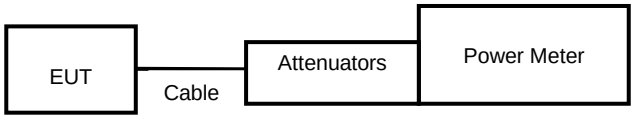
10.1 Test Limit

The Maximum Output Power Measurement is 30dBm.

10.2 Test Procedures

According to the methods defined in ANSI C63.10-2013 Section 11.9.2.3.2
The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

10.3 Test Setup Layout



10.4 Test Result and Data

For Chip:Nordic

(1M bps)

Power Set	Modulation Type	Channel	Frequency (MHz)	Power Output (dBm)	Power Output (mW)
				Average	Average
0	GFSK	0	2402	2.85	1.928
0		19	2440	2.78	1.897
0		39	2480	2.68	1.854

For Chip: WCN3680

(1M bps)

Power Set	Modulation Type	Channel	Frequency (MHz)	Power Output (dBm)	Power Output (mW)
				Average	Average
0x09	GFSK	0	2402	11.48	14.060
0x09		19	2440	9.91	9.795
0x09		39	2480	10.85	12.162

11. Power Spectral Density

11.1 Test Limit

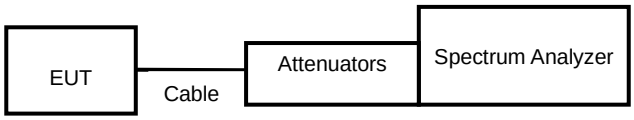
The Maximum of Power Spectral Density Measurement is 8dBm.

If transmitting antennas of directional gain greater than 6 dBi are used, the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

11.2 Test Procedures

According to the methods defined in ANSI C63.10-2013 Section 11.10.1

11.3 Test Setup Layout



11.4 Test Result and Data

For Chip:Nordic

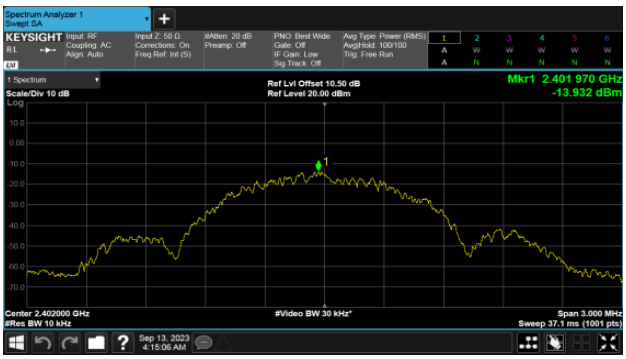
Modulation Type	Channel	Frequency (MHz)	Maximum Power Density of 10KHz Bandwidth(dBm)	Duty Cycle CF(dB)	Total PSD (dBm)	Limit
GFSK(1Mbps)	0	2402	-13.932	1.97	-11.96	8.00
	19	2440	-13.997	1.97	-12.03	8.00
	39	2480	-14.427	1.97	-12.46	8.00

For Chip: WCN3680

Modulation Type	Channel	Frequency (MHz)	Maximum Power Density of 10KHz Bandwidth(dBm)	Duty Cycle CF(dB)	Total PSD (dBm)	Limit
GFSK(1Mbps)	0	2402	-5.048	1.91	-3.14	8.00
	19	2440	-6.833	1.91	-4.92	8.00
	39	2480	-5.692	1.91	-3.78	8.00

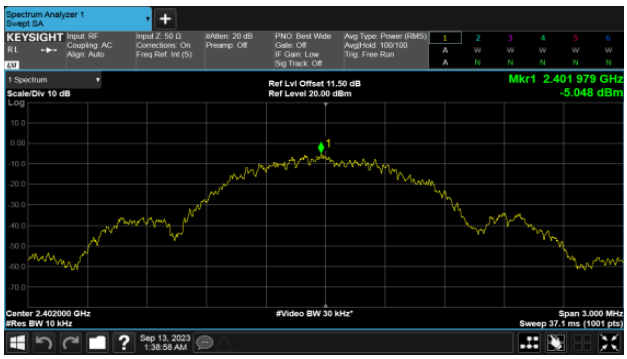
For Chip:Nordic

Modulation Type: GFSK(1Mbps)
CH00

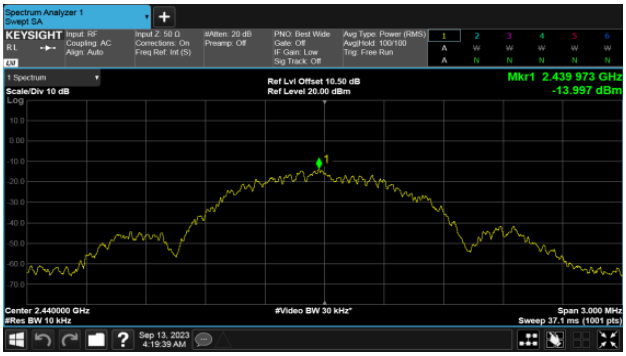


For Chip: WCN3680

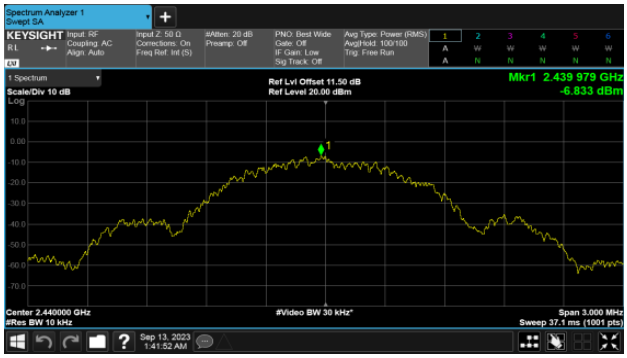
Modulation Type: GFSK(1Mbps)
CH00



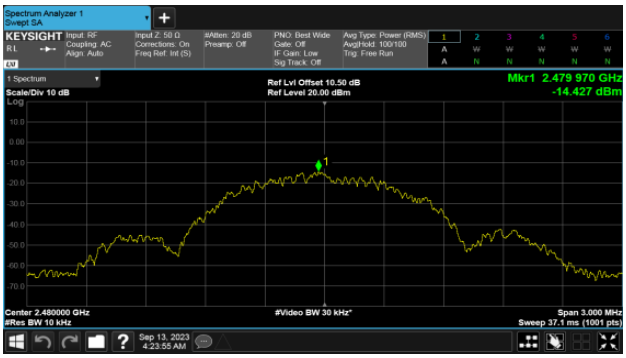
Modulation Type: GFSK(1Mbps)
CH19



Modulation Type: GFSK(1Mbps)
CH19



Modulation Type: GFSK(1Mbps)
CH39



Modulation Type: GFSK(1Mbps)
CH39