Test Report for FCC & IC

Report Number		ESTRGC2409-002		
Applicant	Company name	Suprema Inc		
	Address	17F-5, Parkview office tower, 248, Jeongjail-ro Bundang-gu, Seongnam-si, Gyeonggi-do South Korea		
	Telephone	+82-031-710-2419		
Product	Product name	BioEntry W3		
	Model No.	BEW3-APB	Manufacturer	Suprema Inc
	Serial No.	NONE	Country of origin	KOREA
Test date	14-Aug-24 ~ 19- Aug-24		Date of issue	02-Sep-24
Testing location	140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Rep. of Korea			
FCC ID	TKWBEW3-APB			
ISED ID	23080-BEW3APB			
FCC Rule Part(s)	FCC PART 15 Subpart C (15.247), ANSI C 63.10(2013)			
ISED Rule Part(s)	RSS-247 (2023)			
Test result				Complied
Measurement facility registration number		FCC:659627		
Measurement facility registration number		ISED:4475A		
Tested by	Engineer Y.D. Kim			(Signature)
Reviewed by	Engineering Manager I.K. Hong			(Signature)
Abbreviation	OK, Pass = Complied, Fail = Failed, N/A = not applicable			

* Note
- This test report is not permitted to copy partly without our permission
- This test result is dependent on only equipment to be used
- This test report is not related to KOLAS accreditation
- This product is equipped with a constant voltage circuit and tested at 24V among 12v, 24V and POE power supplies

Contents

1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.
ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Suite 1015 World Meridian II, 123 Gasan Digital 2-ro, Geumcheon-gu, Seoul 153-759, R. O. Korea

EMC/Telecom/Safety Test Lab : 140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Rep. of Korea

1.3 Official Qualification(s)

MSIP : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC

FCC : Filed Laboratory at Federal Communications Commission

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

ISED : Accredited Lab By Canada Laboratory Accreditation

2. Description of EUT

2.1 Summary of Equipment Under Test
Product : BioEntry W3
Model Number : BEW3-APB
Serial Number : NONE
Manufacturer : Suprema Inc
Transfer Rate : NFC(LF)125 kHz, NFC(HF)13.56 MHz, BLE
Power Rating : DC 12 V, 1.2 A, DC 24 V, 0.6 A, POE
Receipt Date : 29-Jul-24
Software version:V1.0.0
Hardware version:V1.0.0
BLE DUTY : 62.50 %

2.2 General descriptions of EUT

Category	Feature	Specification
Credential	Biometric	Face
	RF Option	• **BEW3-DB**: 125kHz EM & 13.56MHz MIFARE, MIFARE Plus, DESFire, DESFire EV1/EV2/EV3[1], FeliCa • **BEW3-APB**: 125kHz EM, HID Prox & 13.56MHz MIFARE, MIFARE Plus, DESFire, DESFire EV1/EV2/EV3[1], FeliCa, iCLASS SE/SR/Seos
	RF Read Range[2]	MIFARE/DESFire/EM/iCLASS: 50 mm, FeliCa/HID Prox: 30 mm
	Mobile	NFC, BLE
General	CPU	1.5 GHz Quad Core
	Memory	16 GB Flash + 2 GB RAM
	Crypto Chip	Supported
	LCD Type	1.3" PMOLED
	LED	Multi-color
	Sound	16 bit
	Operating Temperature	-20 °C ~ 50 °C
	Storage Temperature	-40 °C ~ 70 °C
	Operating Humidity	0 % ~ 80 %, non-condensing
	Storage Humidity	0 % ~ 90 %, non-condensing
	Camera	2 MP 2 EA
	Dimension (W x H x D)	160 x 50 x 34.2 (mm)
	Weight	• Device – **BEW3-DB**: 283 g – **BEW3-APB**: 291 g • Bracket: 36 g
	IP Rating	IP67
	IK Rating	IK08
	Certificates	CE, UKCA, KC, FCC, IC, RCM, BIS, ANATEL, SIG, RoHS, REACH, WEEE, EAC, TELEC

3. Test Standards

Test Standard : FCC PART 15 Subpart C (15.247)
This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Standard : RSS-247

RSS-Gen must be used in conjunction with other RSSs, as applicable to the specific type of radio apparatus, for assessing its compliance with ISED requirements.

Test Method : ANSI C 63.10 (2013)

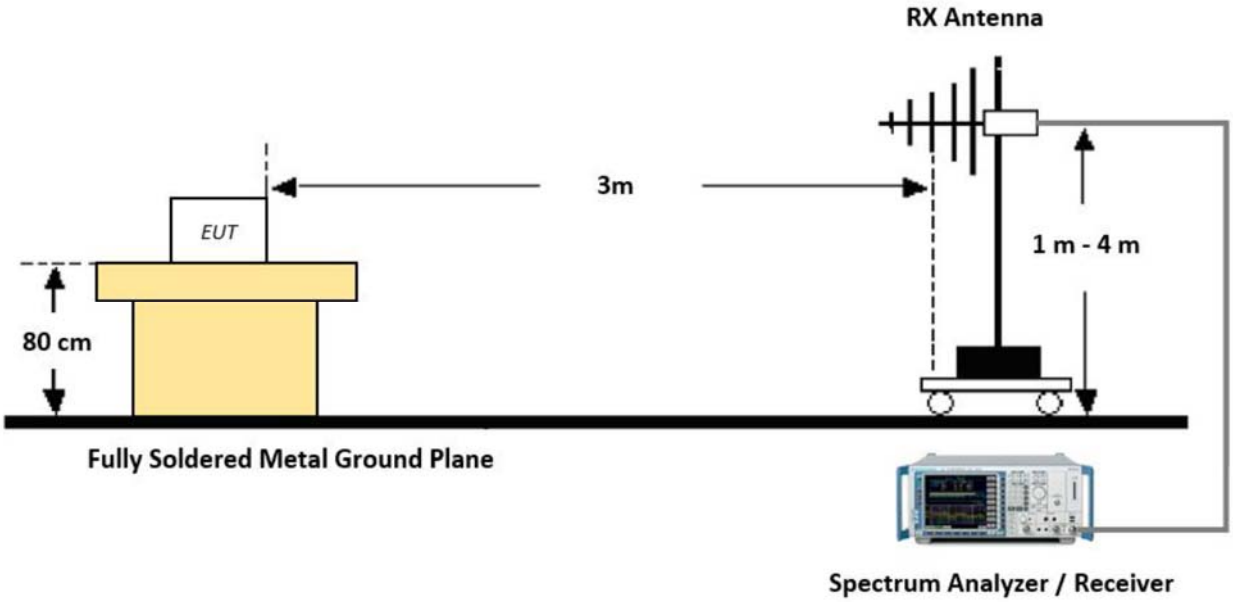
This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain decides that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment These method apply to the measurement of individual units or systems comprised of multiple units

BT Basic Data Rate / Enhanced Data Rate

Test Description	FCC Part Section(s)	ISED Part Section(s)	Test Result
Maximum conducted output power	15.247 (b)(3)	RSS 247 Issue 3, Section 5.4 (d)	Pass
Maximum Power Spectral Density	15.247(e)	RSS 247 Issue 3, Section 5.2 (b)	Pass
DTS Bandwidth	15.247(a)(2)	RSS 247 Issue 3, Section 5.2 (a)	Pass
Emissions in non-restricted frequency bands	15.247(d)	RSS 247 Issue 3, Section 5.5	Pass

Notes:
1). No tests were applied because the fundamental level did not exceed the spurious limit per part 15.209.

30 MHz - 1 GHz



Test Procedure of Radiated spurious emissions (Below 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Spectrum Setting

(1) Measurement Type (Peak):

- Measured Frequency Range: 30 MHz – 1 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 100 kHz
- VBW ≥ 3*RBW

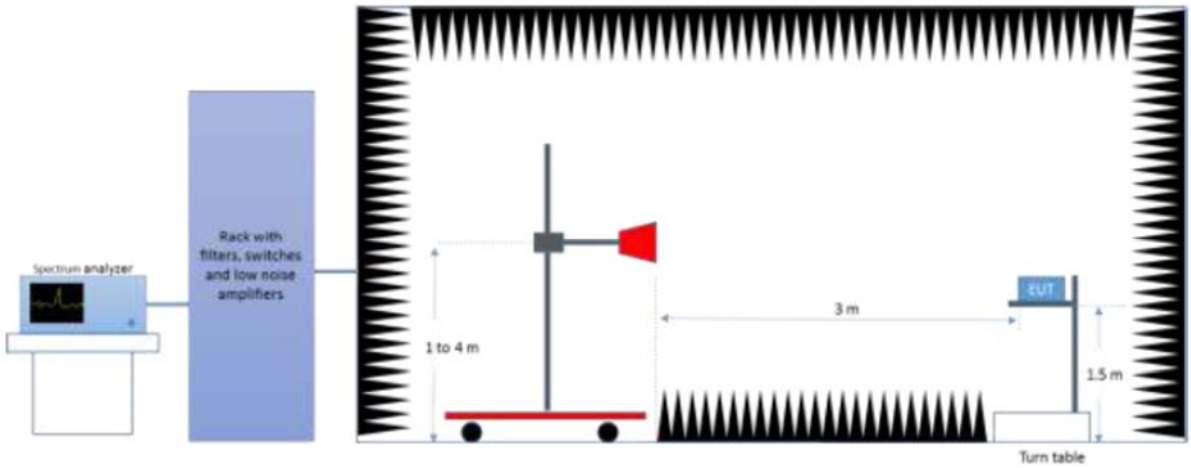
(2) Measurement Type(Quasi-peak):

- Measured Frequency Range: 30 MHz – 1 GHz
- Detector = Quasi-Peak
- RBW = 120 kHz

In general, the method (1) is mainly used

6. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)

1 GHz – 26.5 GHz



Test Procedure of Radiated spurious emissions (Above 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Spectrum Setting

(1) Measurement Type (Peak):

- Measured Frequency Range: 1 GHz – 26.5 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 1 MHz
- VBW ≥ 3*RBW

(2) Measurement Type(Average):

- Measured Frequency Range: 1 GHz – 26.5 GHz
- Detector = average or rms
- RBW = 1 MHz

In general, the method (1) is mainly used

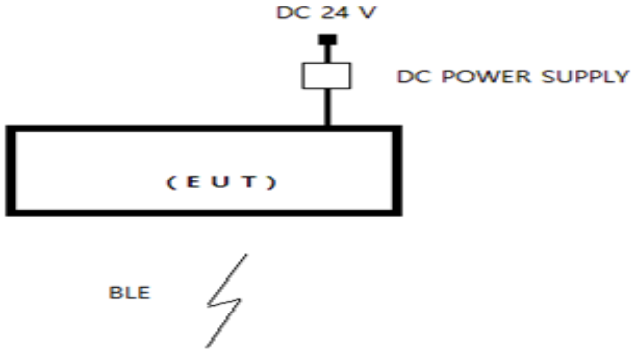
6. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)

4. Measurement Condition

4.1 EUT Operation.

* The EUT was in the following operation mode during all testing
* The operational conditions of the EUT was determined by the manufacturer according to emission
* Execute a RF test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
* Transmit mode was each test. Each channel (low, middle, high), also set the test after
* The EUT was measured up to tenth harmonic or 40 GHz of the highest operating frequencies.

4.2 Configuration and Peripherals



4.3 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark
BioEntry W3	BEW3-DB	NONE	Suprema Inc	EUT
Notebook	NT550XEZ	NONE	Samsung Electronics Vieteam Co.,Ltd.	
Adapter	EP-TA845 001	NONE	Solum Vina Company Limited	

4.4 List of frequencies

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
BLE (2400 ~ 2483.5)	0	2402
	1	2404
	2	2406
	:	:
	:	:
	18	2438
	19	2440
	20	2442
	:	:
	:	:
	37	2476
	38	2478
	39	2480

List of BLE center Frequencies

4.5 Measurement equipments (Conducted)

Description	Model	Serial Number	Cal. Date	Cal. Due Date
Spectrum Analyzer	E440A	US42041291	27-Nov-23	27-Nov-24
Spectrum Analyzer	FSV40	100939	27-Nov-23	27-Nov-24
Power meter	N1912A	MY45100570	28-Nov-23	28-Nov-24
Power sensor	A1921A	MY45240427	28-Nov-23	28-Nov-24
RF Cable	Length: 100 cm	-		

4.6 Measurement equipments(Radiated setup)

Equipment Name	Type	Manufacturer	Serial No.	Cal. Date	Cal. Due Date
TEST Receiver	ESCI7	ROHDE & SCHWARZ	100916	6-Jun-24	6-Jun-25
LOOP Antenna	HFH2-Z2	ROHDE & SCHWARZ	100188	29-Aug-22	29-Aug-24
Logbicon Antenna	VULB 9168	SCHWARZBECK	193	25-Dec-24	25-Dec-25
Turn Table	DT3000-2t	Innco System GmbH	N/A	-	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-	-
PREAMPLIFIER	8449B	HP	3008A00581	04-Jun-24	04-Jun-25
Horn Antenna	LB-42-15-C-SF	A-INFOMF	J2020079000055	01-Nov-23	01-Nov-24
Horn Antenna	BBHA9120D	SCHWARZBECK	469	26-Oct-23	26-Oct-24
TEST Receiver	ESU	ROHDE & SCHWARZ	100529	03-Jun-24	03-Jun-25
Turn Table	DT1500-S	Innco System GmbH	N/A	-	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-	-
Antenna Master & Turn table controller	CO2000-P	Innco System GmbH	CO2000/642 /28051111/L	-	-

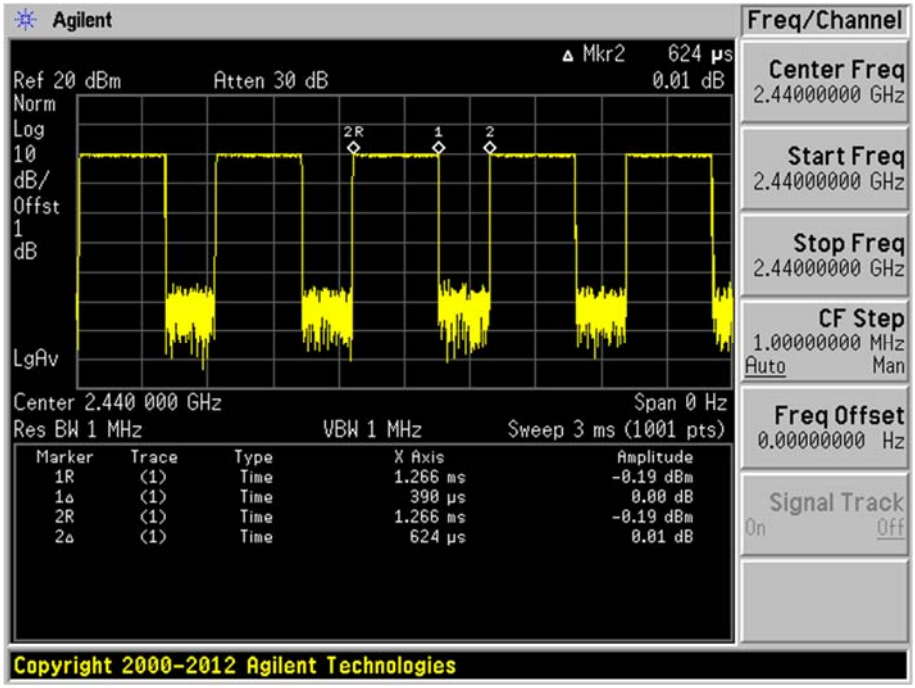
4.7 Duty Cycle of Test Signal

If duty cycle is ≥ 98 %, duty factor is not required.
If duty cycle is < 98 %, duty factor shall be considered.
All the duty factor of other test mode have been considered.

TestMode	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Duty Cycle Correction Factor(dB)
BLE	2440	0.390	0.624	62.50	2.04

Note: The Duty Cycle of different channels in the same mode is the same, and the above test channels are represented in the report.

Duty cycle plot

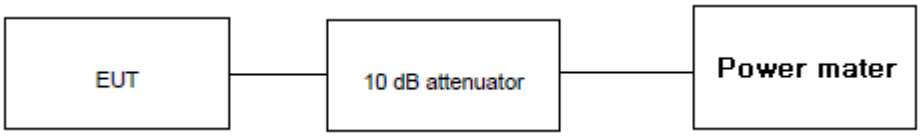


5 TEST RESULTS FOR BLUETOOTH LOW ENERGY

5.1 Maximum Peak Conducted Output Power

Result	***Pass***
Test Specification	FCC part 15 Subpart C 15.247 (b)(3) / RSS 247 Issue 3, Section 5.4 (d)
Test Method	Subclause 11.9.1.1 of ANSI C63.10
Measurement Bandwidth	1MHz
Detector	Peak
Port of testing	Antenna port
Requirement	Power ≤ 1 W (30 dBm) & e.i.r.p ≤ 4 W (36 dBm)

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = + 23.4 °C	Voltage =24.0 V	Relative humidity: 54%

KDB Guidelines applied:

Measurements were made as per section 8.3.1 in KDB 558074.00 D01 15.247 Measurement Guidance v05r02.

Test results:

Note:

1. All the losses are included during measurement and final values are mentioned in the test report.
2. Peak Output power (dBm) = Measured peak power (dBm) + Attenuator factor (10dB) + Cable loss (1.0dB)
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the single antenna is 2.58 dBi

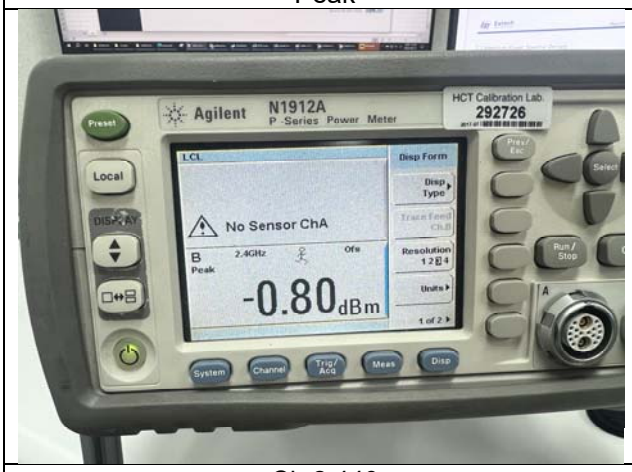
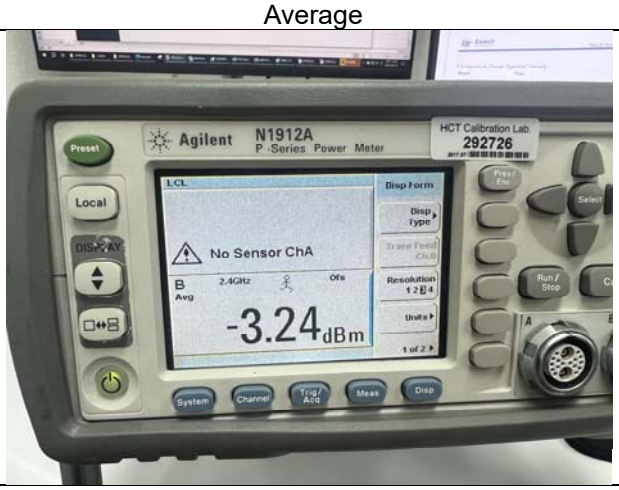
Test data

Data Rate	Channel Frequency (MHz)	Measured Peak Power (dBm)	Measured Peak Power (mW)	e.i.r.p (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
1 Mbps	2402	-1.04	0.79	1.54	30	36
	2440	-0.80	0.83	1.78	30	36
	2480	-0.60	0.87	1.98	30	36

Data Rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Measured Average Power (mW)	e.i.r.p (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
1 Mbps	2402	-3.51	0.45	-0.93	30	36
	2440	-3.24	0.47	-0.66	30	36
	2480	-2.99	0.50	-0.41	30	36

Test plot

Peak	Average
	
Ch 2 402	Ch 2 402

Peak	Average
	
Ch 2 440	Ch 2 440

Peak	Average
	
Ch 2 480	Ch 2 480

5.2 Maximum Power Spectral Density

Result	***Pass***
Test Specification	FCC part 15 Subpart C 15.247 (e) / RSS 247 Issue 3, Section 5.2 (b)
Test Method	Subclause 11.10.2 of ANSI C63.10
Measurement Bandwidth	3 kHz
Detector	Peak
Port of testing	Antenna port
Requirement	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm

Test Method:

Test Condition

Normal Test Condition:

Temperature (Norm) = + 22.3 °C	Voltage =24.0 V	Relative humidity: 58%

KDB Guidelines applied:

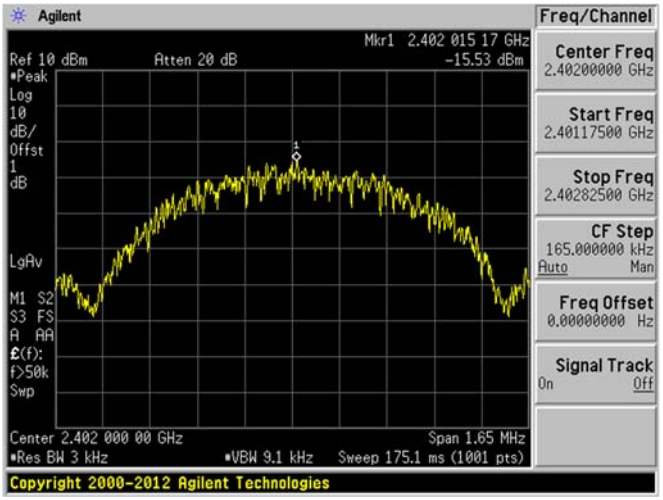
Measurements were made as per section 8.4 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

Test results:

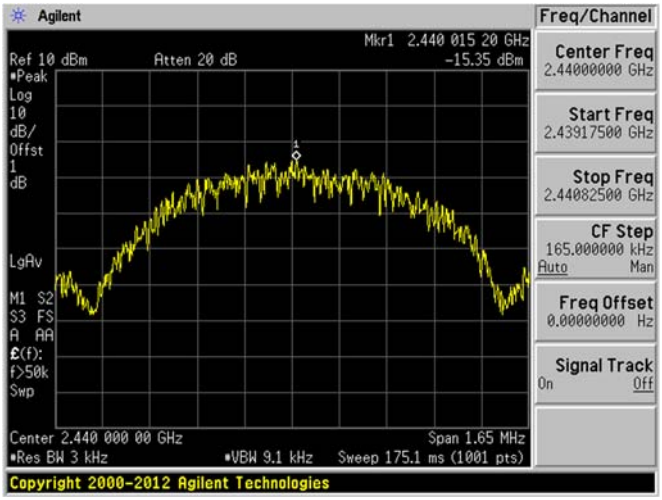
Note:

1. All the losses are included during measurement and final values are mentioned in the test report.
2. Peak Output power (dBm) = Measured peak power (dBm) + Cable loss (1.0dB)
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the single antenna is 2.58 dBi

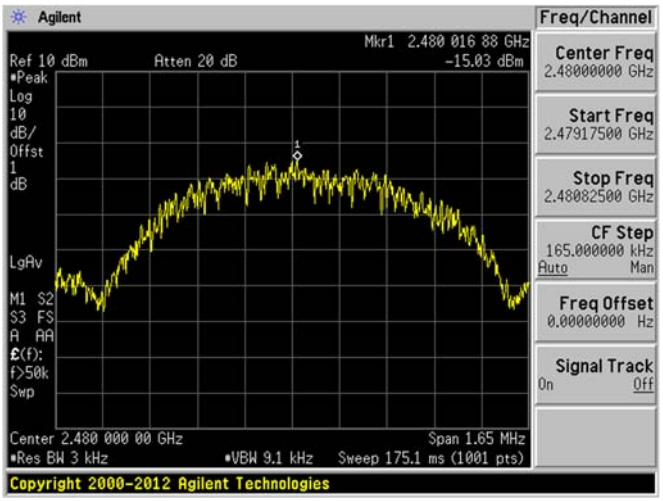
Data rate	Channel Frequency (MHz)	Maximum Peak PSD (dBm/3 kHz)	Limit (dBm/3 kHz)
1Mbps	2402	-15.53	8
	2440	-15.35	8
	2480	-15.03	8



Channel Frequency: 2402MHz



Channel Frequency: 2440MHz



Channel Frequency: 2480MHz

5.3 DTS Bandwidth & 99% Bandwidth

Result	***Pass***
Test Specification	FCC part 15 Subpart C 15.247 (a) (2) / RSS 247 Issue 3, Section 5.2 (a)
Test Method	Subclause 11.8.1 of ANSI C63.10
Measurement Bandwidth	100 kHz for x dB bandwidth 1 to 5% of OCB for 99% bandwidth
Detector	Peak
Port of testing	Antenna port
Requirement	The minimum 6 dB bandwidth shall be at least 500 kHz

Test Method:

Test Condition

Normal Test Condition:

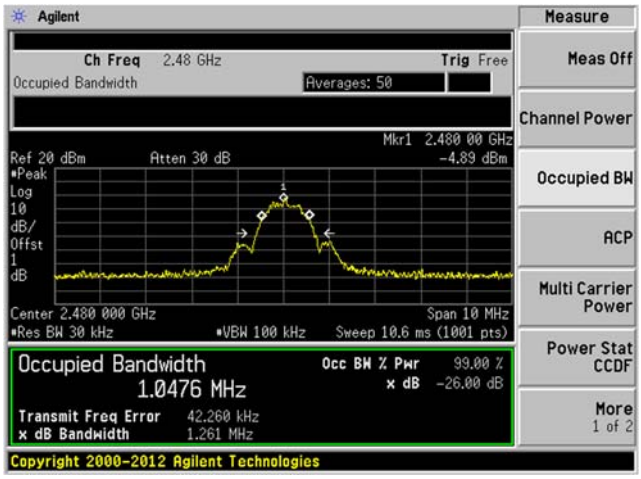
Temperature (Norm) = + 22.3 °C	Voltage =24.0 V	Relative humidity: 57%

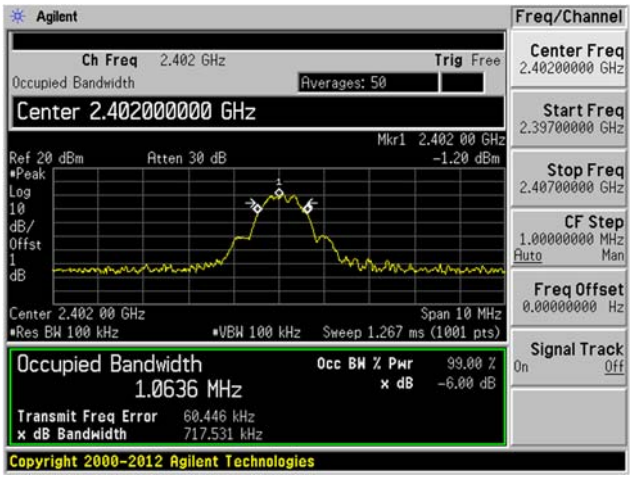
KDB Guidelines applied:
Measurements were made as per section 8.2 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

Test results:

Note:
1. All the losses are included during measurement and final values are mentioned in the test report.
2. Peak Output power (dBm) = Measured Peak power (dBm) + Cable loss (1.0dB)
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the single antenna is 2.58 dBi

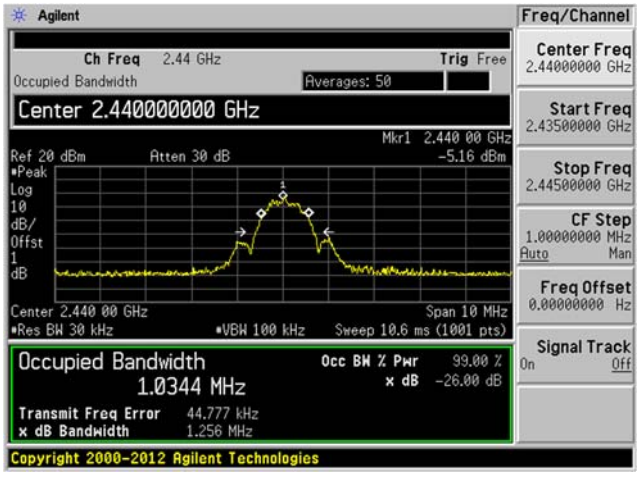
Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
1Mbps	2402	0.72	1.05	0.5
	2440	0.72	1.03	0.5
	2480	0.73	1.04	0.5

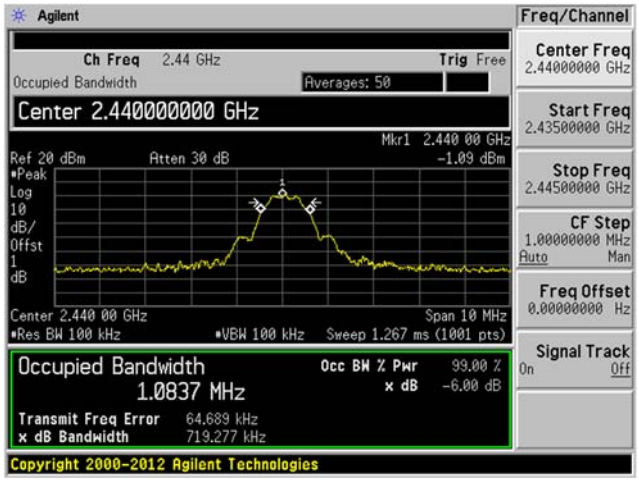




OCB 99% **DTS Bandwidth (6dB BW)**

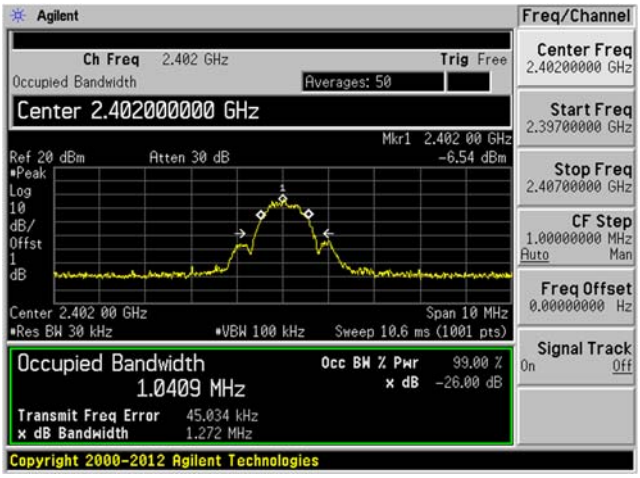
Channel Frequency: 2402MHz

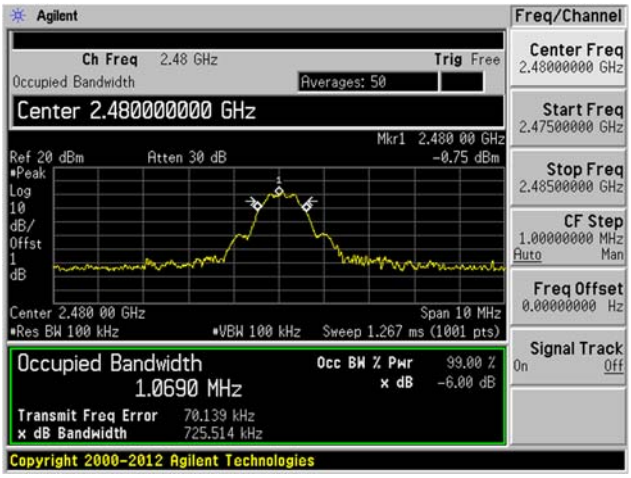




OCB 99% **DTS Bandwidth (6dB BW)**

Channel Frequency: 2440MHz





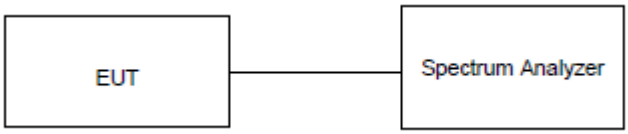
OCB 99% **DTS Bandwidth (6dB BW)**

Channel Frequency: 2480MHz

5.4 Emissions in non-restricted frequency bands and Conducted Spurious Emission

Result	***Pass***
Test Specification	FCC part 15 Subpart C 15.247 (d) / RSS 247 Issue 3, Section 5.5
Test Method	Subclause 11.11 of ANSI C63.10
Measurement Bandwidth	100 kHz
Detector	Peak
Port of testing	Antenna port
Requirement	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 30dB 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, provided the transmitter demonstrates compliance with the peak conducted power limits If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = + 22.3 °C	Voltage =24.0 V	Relative humidity: 58%

KDB Guidelines applied:

Measurements were made as per section 8.5 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

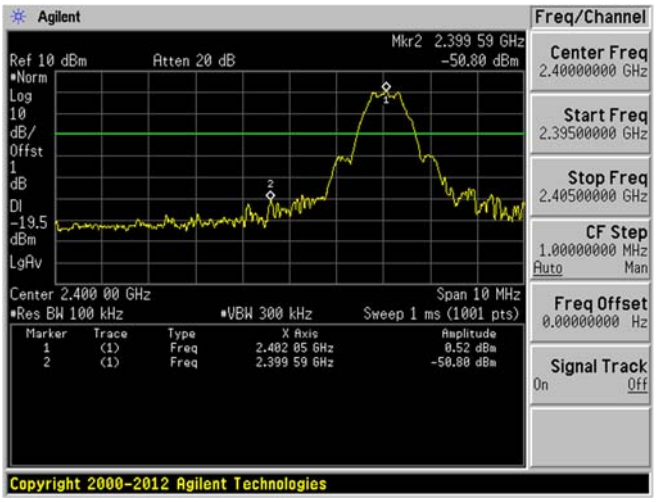
Test results:

Note:

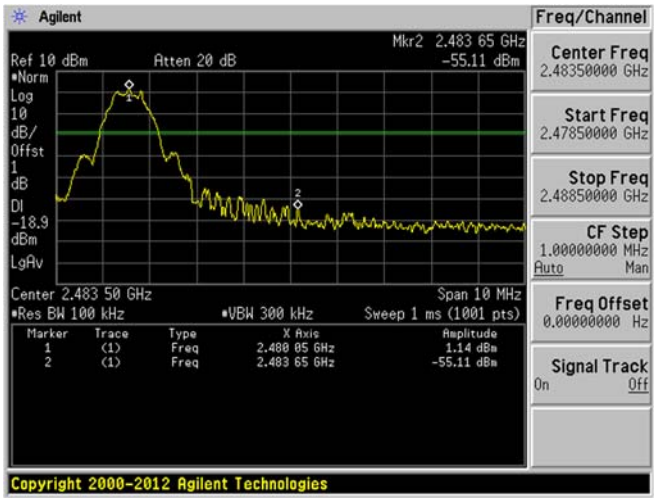
1. All the losses are included during measurement and final values are mentioned in the test report.
2. Peak Output power (dBm) = Measured peak power (dBm) + Cable loss (1.0dB)
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the single antenna is 2.58 dBi

5.4.1 Band edge and reference plots

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
1Mbps	2402	0.52	2400	-50.80	-51.32	20
	2480	1.14	2483.5	-55.11	-56.25	20



Reference Plot for Channel Frequency 2402MHz



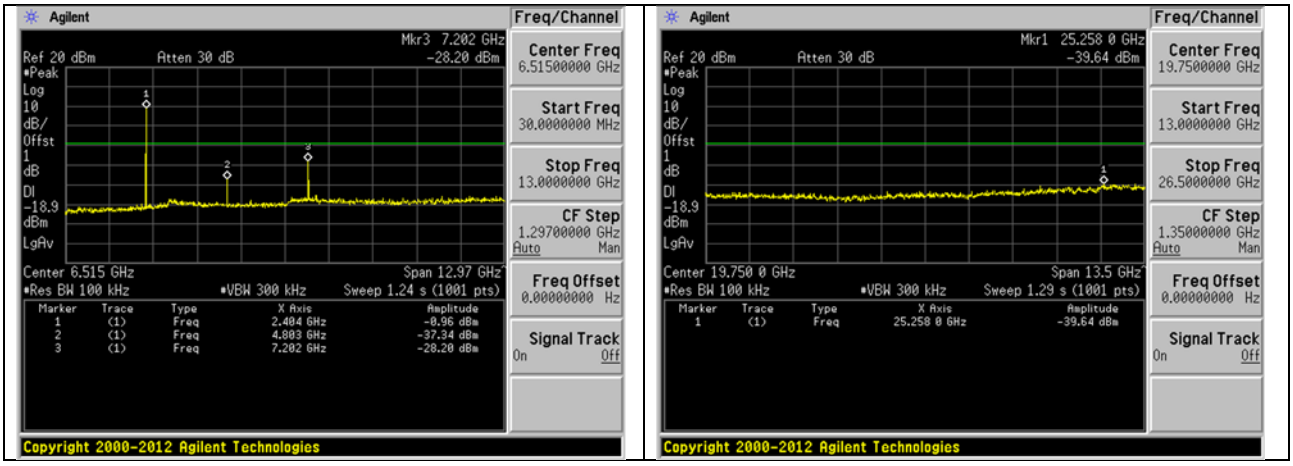
Reference Plot for Channel Frequency 2480MHz

Channel Frequency: 2402MHz

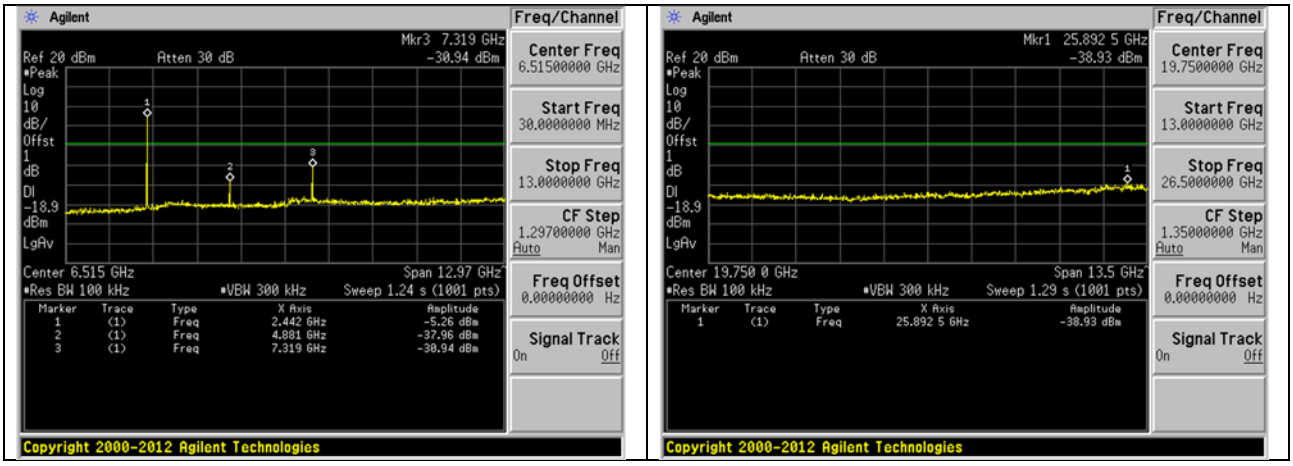
Channel Frequency: 2480MHz

5.4.2 Out-Of-Band Emissions

Channel Frequency BLE 2402 MHz



Channel Frequency BLE 2440 MHz



Channel Frequency BLE 2480 MHz

5.5 Spurious Radiated Emissions & Restricted Bands of Operation

Result	***Pass***
Test Specification	FCC part 15 Subpart C 15.247 (d) / (15.209 & 15.205) RSS-Gen Issue 5, Section 8.9 /8.10
Test Method	ANSI C63.10
Measurement Location	Semi Anechoic Chamber 30MHz - 1 GHz Fully Anechoic Chamber 1 GHz - 40GHz
Measurement Bandwidth	100 kHz for frequency range < 1GHz 1 MHz for Frequency range >1GHz
Detector	Peak or Quasi-peak
Port of testing	Antenna port
Measuring Distance	3 m
Requirement	As per the limits mentioned in the below table
Test setup	Refer TEST METHODOLOGY

Frequency (MHz)	FCC Field strength (㎶/m)	ISED Field strength (㎶/m)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	**6.37/F(F in kHz)**	**300***
0.490 – 1.705	24000/F(kHz)	**63.7/F(F in kHz)**	**30***
1.705 -30	30	**0.08**	**30***
30-88	**100**	**100**	**3**
88-216	**150**	**150**	**3**
216-960	**200**	**200**	**3**
Above 960	**500**	**500**	**3**

Remark: * The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and
1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 128.51 – 93.80, 73.80 – 62.96 and 69.54.00 dBμV/m at 3m range by extrapolation calculation and the measurement of loop antenna. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

Test procedures

Radiated emissions from the EUT were measured according to the dictates in section 11.11 & 11.12 of ANSI C63.10-2013 and only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

Test Procedures for emission above 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site below 1 GHz and 1.5 meters above the ground at a 3 meter anechoic chamber test site above 1 GHz. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a bi-log antenna, a horn antenna and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

5. For measurements below 1 GHz resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.
6. For measurements Above 1 GHz resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements..

Test Condition

Normal Test Condition:

Temperature (Norm) = + 22.3 °C	Voltage =24.0 V	Relative humidity: 57 %

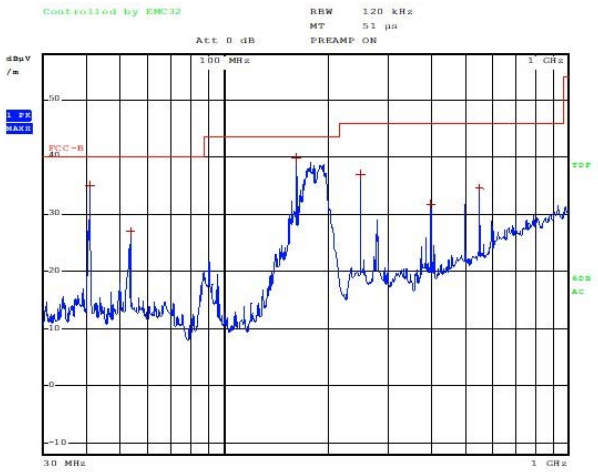
Test results:

Test results for frequency range 9kHz – 30MHz
No emissions found in frequency range 9 kHz to 30 MHz, and measured levels are below 20dB from the limit line, henve not reported

Test results for frequency range 30MHz ~ 1GHz

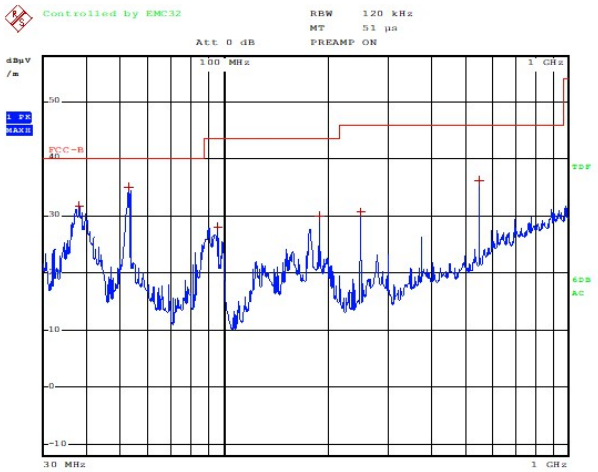
Frequency (MHz)	Reading (dB ㎶)	Position (V/H)	Height (m)	Correction Factor		Result Value(Peak)		
				Ant Factor (dB)	Cable (dB)	Limit (dB ㎶/m)	Result (dB ㎶/m)	Margin (dB)
36	23.99	V	1.0	12.26	0.78	40.00	37.03	-2.96
67.8	15.13	V	1.0	12.11	1.07	34.00	28.31	-11.68
189.8	24.40	H	1.0	10.52	1.87	43.50	36.78	-6.71
250	27.26	V	1.0	11.70	2.17	46.00	41.13	-4.86
550	9.95	H	1.0	18.50	3.33	46.00	31.78	-14.21
700	13.46	V	1.0	20.80	3.84	46.00	38.10	-7.89
Remark	H : Horizontal, V : Vertical TEST MODE : BT BLE (CH : 19 - 2 440 MHz) *Checked in all 3 axis and the maximum measured data were reported.(Worst data is X axis of position) *CL = Cable Loss(In case of below 1 000 MHz) *Result Value = Reading + Ant Factor + Cable loss *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for peak detection at frequency below 1 GHz. * This test was tested when transmitted.							

BLE 1M Polarity:Horizontal



ESTR-24-00142
Date: 22.AUG.2024 21:25:51

BLE 1M Polarity:Vertical



ESTR-24-00142
Date: 22.AUG.2024 21:32:05

Test results for the frequencies above 1GHz

Test Data(Low)

BLE 1Mbps Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	AMP & Cable (dB)		Limit (dB μV/m)	Result (dB μV/m)	Margin (dB)
PEAK(RBW: 1 MHz VBW: 3 MHz)									
2390.00	47.43	H	1.5	27.24	-27.96		74.00	46.71	27.29
2388.46	48.26	V	1.5	27.24	-27.96		74.00	47.54	26.46
AV(RBW: 1 MHz VBW: 3 MHz)									
2388.65	38.91	H	1.5	27.24	-27.96	2.04	54.00	40.23	13.77
2388.65	41.02	V	1.5	27.24	-27.96	2.04	54.00	42.34	11.66

Remark	H : Horizontal, V : Vertical TEST MODE : CH : 0 - 2 402 MHz (x postion) *The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported.(Worst data is X axis of position) *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured. * This test was tested when transmitted.

Test Data(Mid)

BLE 1Mbps

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	AMP & Cable (dB)		Limit (dB μV/m)	Result (dB μV/m)	Margin (dB)
PEAK(RBW: 1 MHz VBW: 3 MHz)									
Emission levels are not reported much lower than the limits by over 10 dB.									
AV(RBW: 1 MHz VBW: 3 MHz)									
Emission levels are not reported much lower than the limits by over 10 dB.									

Remark	
	H : Horizontal, V : Vertical TEST MODE : CH : 19 - 2 440 MHz (x postion) *The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported.(Worst data is X axis of position) *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured. *See the data plot below * This test was tested when transmitted.

Test Data(High)

BLE 1Mbps

Measurement Distance : 3 m

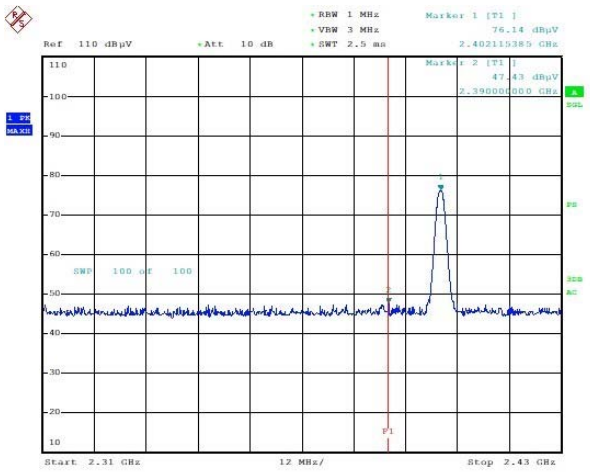
Frequency (MHz)	Reading (dB μV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	AMP & Cable (dB)		Limit (dB μV/m)	Result (dB μV/m)	Margin (dB)
PEAK(RBW: 1 MHz VBW: 3 MHz)									
2483.50	46.11	H	1.5	27.36	-27.90		74.00	45.57	28.43
2483.61	48.76	V	1.5	27.36	-27.90		74.00	48.22	25.78
AV(RBW: 1 MHz VBW: 3 MHz)									
2483.50	37.10	H	1.5	27.36	-27.90	2.04	54.00	38.60	15.40
2483.50	38.30	V	1.5	27.36	-27.90	2.04	54.00	39.80	14.20

Remark	H : Horizontal, V : Vertical TEST MODE : CH : 39 - 2 480 MHz (x postion) *The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported.(Worst data is X axis of position) *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured. * This test was tested when transmitted.

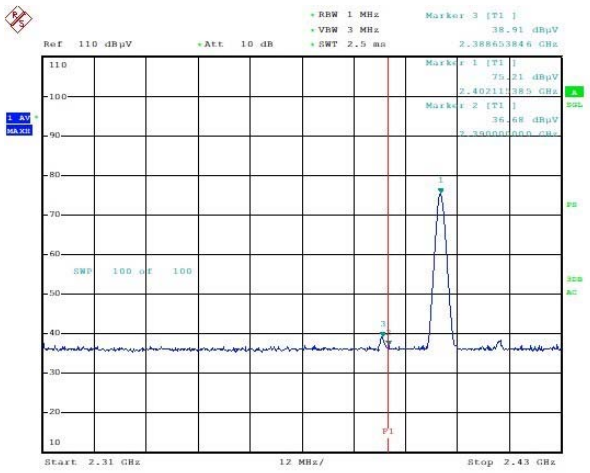
Restricted Band Edges

Band Edges(BLE CH Low)

Detector mode : Peak Polarity : Horizontal

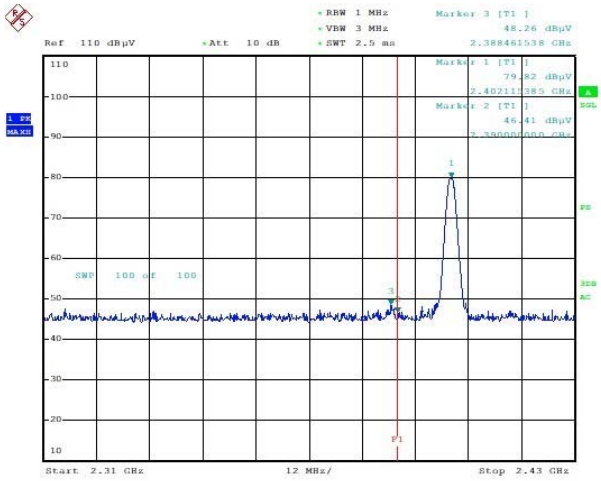


Detector mode : Average Polarity : Horizontal

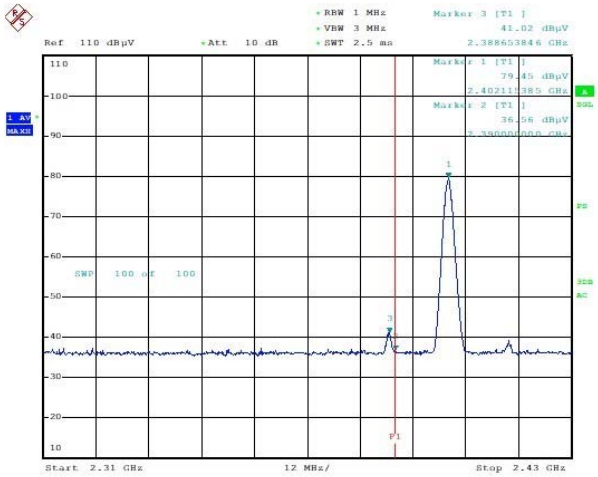


Band Edges(BLE CH Low)

Detector mode : Peak Polarity : Vertical

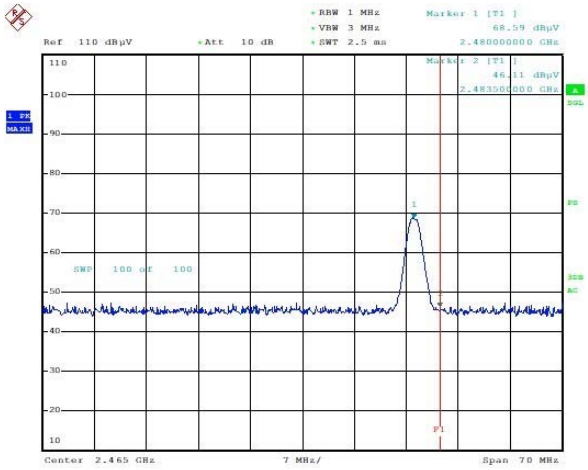


Detector mode : Average Polarity : Vertical

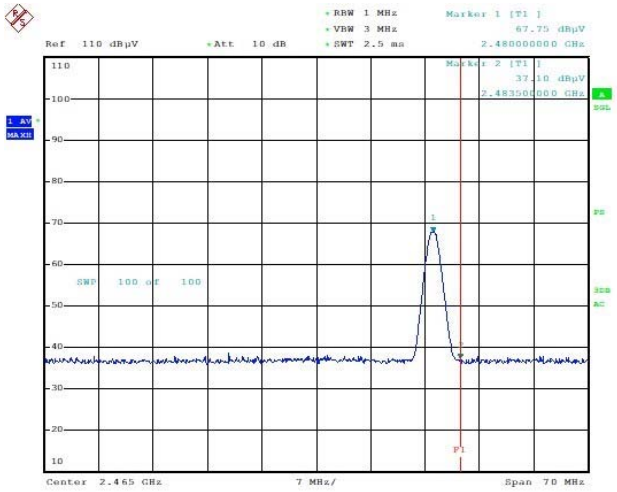


Band Edges(BLE CH High)

Detector mode : Peak Polarity : Horizontal

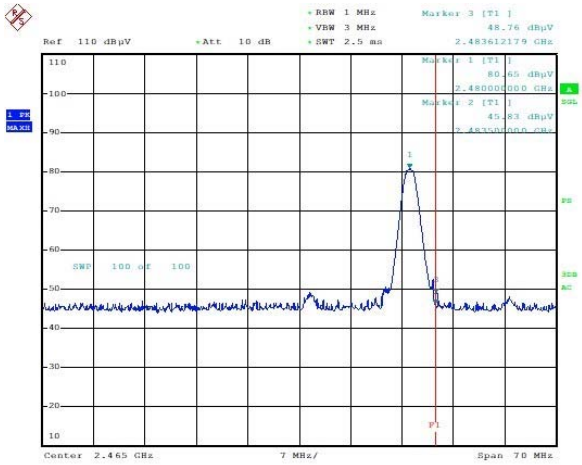


Detector mode : Average Polarity : Horizontal

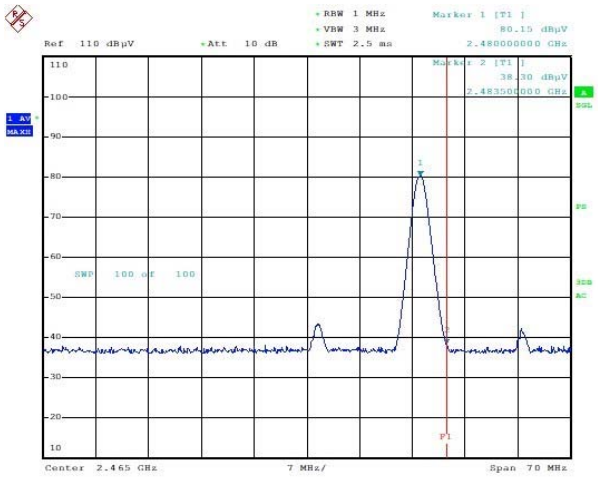


Band Edges(BLE CH High)

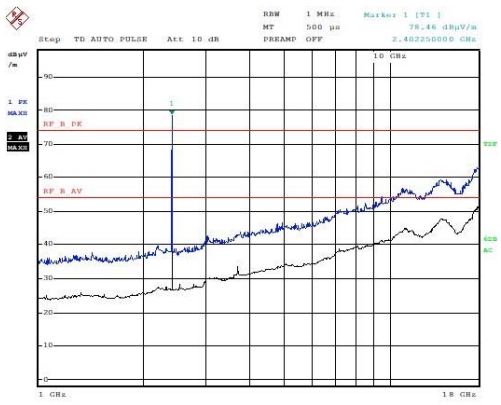
Detector mode : Peak Polarity : Vertical



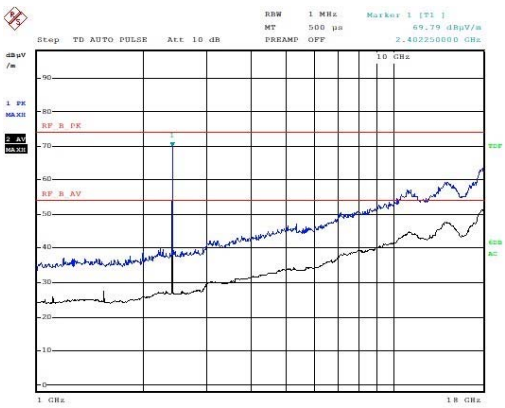
Detector mode : Average Polarity : Vertical



Modulation: Band Edges **BLE CH Low**

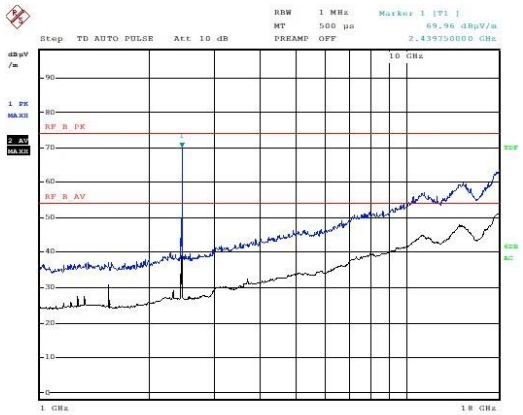


Polarity:Horizontal

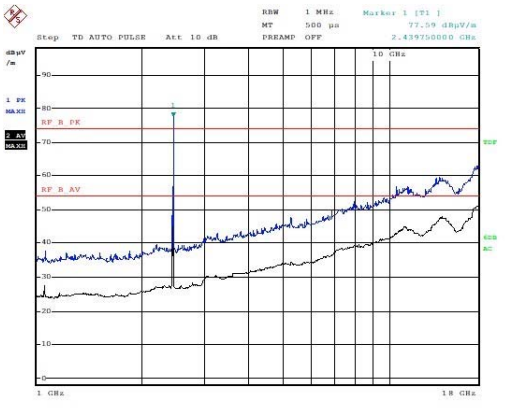


Polarity:Vertical

Modulation: Band Edges **BLE CH Mid**

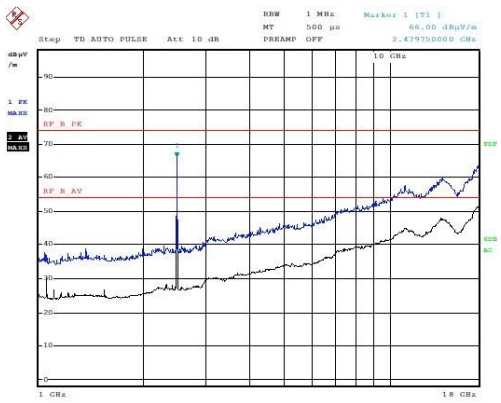


Polarity:Horizontal

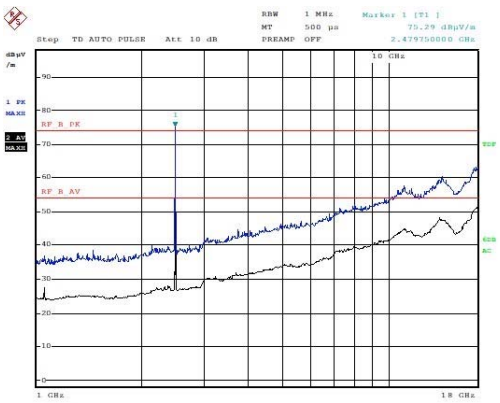


Polarity:Vertical

Modulation: Band Edges **BLE CH High**



Polarity:Horizontal



Polarity:Vertical