

## TEST REPORT NO. 141/K34/D/2023 FOR: BLUETOOTH LOW ENERGY TRANSMITTER

### SPRAWOZDANIE Z BADAŃ NR 141/K34/D/2023 DLA URZĄDZENIA: NADAJNIK BLUETOOTH LOW ENERGY

#### I. General information / Podstawowe informacje

According to Customer requirements, the conformity statement for radio parameters of EUT was done according to essential requirements of article 3.2 of Directive 2014/53/EU (RED) of the following harmonized standard:

- ETSI EN 300 328 V2.2.2 (2019-07) - Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonised Standard for access to radio spectrum

Zgodnie z wymaganiami Klienta, stwierdzenie zgodności dla parametrów radiowych urządzenia testowanego dokonano zgodnie z wymaganiami zasadniczymi artykułu 3.2 Dyrektywy 2014/53/UE (RED) z wykorzystaniem następującej normy zharmonizowanej:

- ETSI EN 300 328 V2.2.2 (2019-07) - Szerokopasmowe systemy transmisyjne - Urządzenia transmisji danych pracujące w paśmie 2,4 GHz - Zharmonizowana norma dotycząca dostępu do widma radiowego

<b>Report Reference No.</b> <i>Numer sprawozdania</i>	141/K34/D/2023
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<b>Approved by:</b> <i>Autoryzował:</i>	Monika Szafrąńska, MSc Eng. 
<b>Issue Date / Data wydania</b>	December 8, 2023
<b>Testing Laboratory:</b> <i>Laboratorium badawcze:</i>	Laboratory of Electromagnetic Compatibility (LKE) / <i>Laboratorium Kompatybilności Elektromagnetycznej (LKE)</i> Wrocław University of Science and Technology / Politechnika Wrocławska Wybrzeże Wyspiańskiego 27, 50-370 Wrocław, Poland Phone/tel.: (+4871) 320-29-47, 320-42-96 fax: (+4871) 322-34-73  Accreditation Certificate of the Polish Centre for Accreditation No. AB 167 (granted on April 30 1998, issued on September 01, 2020) / <i>Certyfikat PCA nr AB 167 (przyznany 30 kwietnia 1998, wydany 01 września 2020)</i>
 	
<b>Test facility:</b> <i>Miejsce wykonywania badań:</i>	Laboratory of Electromagnetic Compatibility (LKE) / <i>Laboratorium Kompatybilności Elektromagnetycznej (LKE)</i> Wrocław University of Science and Technology / Politechnika Wrocławska Wybrzeże Wyspiańskiego 27, 50-370 Wrocław, Poland
<b>Customer:</b> <i>Klient:</i>	VECTOR BLUE HUB S.A.
<b>Address of the customer:</b> <i>Adres klienta:</i>	ul. Krzemowa 6, Gdynia 81-577
<b>Order number/Date of order:</b> <i>Numer zamówienia/ Data zamówienia:</i>	Order G12785 issued on 04.12.2023



<b>Equipment under test (EUT):</b> <i>Badany obiekt:</i>	'Storm' device (Bluetooth Low Energy Transmitter) <i>Urządzenie 'Storm' Nadajnik Bluetooth Low Energy</i>	
<b>Manufacturer:</b> <i>Producent:</i>	Kimberly-Clark Corporation	
<b>Address of manufacturer:</b> <i>Adres producenta:</i>	1400 Holcom Bridge Road Roswell, Georgia 30076 United States of America (USA)	
<b>Testing period / Okres przeprowadzania badań</b>		
<b>Date of receipt of test sample / Data dostarczenia obiektu badań:</b>	December 08, 2023	
<b>Testing commenced on / Rozpoczęcie badań:</b>	December 08, 2023	
<b>Testing finished on / Zakończenie badań:</b>	December 08, 2023	
<b>Testing program / Program badań</b>		
<b>EUT's testing program accepted by the Customer included in:</b> <i>Program badań EUT zaakceptowany przez Zamawiającego zawarto w:</i>	<input type="checkbox"/>	FS-04_01
	<input type="checkbox"/>	FS-04_02
	<input checked="" type="checkbox"/>	Testing program (see Appendix 2) / <i>Program badań (patrz Załącznik 2)</i>
<b>Type of performed tests:</b> <i>Rodzaj przeprowadzonych badań:</i>	<input checked="" type="checkbox"/>	Final / <i>Końcowe</i>
	<input type="checkbox"/>	Development / <i>Rozwojowe</i>
	<input type="checkbox"/>	Engineering / <i>Konstruktorskie</i>
<b>Notes / Uwagi:</b> <ol style="list-style-type: none"><li>For engineering tests, the LKE do not declare a statement of conformity to any specification, standard or requirement.</li><li>Engineering tests are performed to prepare the EUT to be introduced to the market and can be performed on the Customer request according to the standards, requirement or standardized testing methods, including additional customer requests too.</li><li>In any case test results obtained during engineering tests cannot be taken into account for a statement of conformity decision.</li><li>Test results obtained during development tests can be taken into account for a statement of conformity to specification, standard or requirement, which test was based on.</li><li>For final tests and on the Customer request, the LKE declares the statement of conformity (conformity with requirements) according to the requirements listed by Customer or included in standard/standards</li><li>In a test report from engineering test/tests it is not necessary to show all the data and results, that are needed for the report from final test/tests including a statement of conformity to specification, standard or requirement.</li></ol> <ol style="list-style-type: none"><li><i>Dla badań konstruktorskich LKE nie dokonuje stwierdzenia zgodności z jakąkolwiek specyfikacją, normą lub wymaganiem,</i></li><li><i>Badania konstruktorskie mają na celu przygotowanie produkty do wprowadzenia na rynek i mogą na życzenie klienta być prowadzone w oparciu o wymagania zawarte w standardach / zstandaryzowanych metodach, również z uwzględnieniem dodatkowych życzeń klienta,</i></li><li><i>Wyniki badań konstruktorskich nie mogą użycie do stwierdzenia zgodności.</i></li><li><i>Wyniki badań rozwojowych mogą stanowić podstawę do przeprowadzenia stwierdzenia zgodności z wymaganiami.</i></li><li><i>Dla badań końcowych i na życzenie Klienta, LKE stwierdza zgodność z wymaganiami zawartymi w normie/normach lub dostarczonymi przez Klienta.</i></li><li><i>W przypadku badań konstruktorskich nie jest konieczne przedstawienie w sprawozdaniu wszystkich danych i wyników, które wymagane są dla badań końcowych urządzenia, które są podstawą do stwierdzenia zgodności z wymaganiami</i></li></ol>		
<b>EUT's testing program according to the standard:</b> <i>Program badań EUT wykonano zgodnie z normą:</i>	<input checked="" type="checkbox"/>	YES / <i>TAK</i>
	<input type="checkbox"/>	NO / <i>NIE</i>



<b>Applied standard specifying the testing program:</b> <i>Zastosowana norma określająca program badań:</i>	ETSI EN 300 328 V2.2.2 (2019-07) [1]	
<b>Test program has included all required tests defined for the EUT in the applied standards:</b> <i>Program badań obejmował wszystkie testy określone dla EUT w zastosowanych normach:</i>	<input type="checkbox"/>	YES /TAK
	<input checked="" type="checkbox"/>	NO /NIE
<b>Environmental conditions / Warunki środowiskowe</b>		
<b>Temperature / Temperatura:</b>	15 to 35°C	
<b>Humidity / Wilgotność:</b>	30 to 60%	
<b>Atmospheric pressure / Ciśnienie atmosferyczne</b>	990 – 1020 hPa	
<b>Note:</b> All tests and measurements in the LKE were performed in room with monitored ambient conditions (in the SAC (Semi Anechoic Chamber and FAR (Fully Anechoic Room) ambient conditions are controlled automatically: temp. 22 ± 4°C, humidity 45 ± 15%). Conducted and radiated emission measurements and radiated immunity tests were performed in shielded enclosures. <i>Uwaga:</i> Wszystkie testy i pomiary w laboratorium LKE zostały wykonane w pomieszczeniach z monitorowanymi warunkami środowiskowymi (warunki środowiskowe w SAC (Semi Anechoic Chamber) i FAR (Fully Anechoic Room) są kontrolowane automatycznie: temp. 22±4°C, wilgotność 45±15%). Pomiary emisji zaburzeń przewodzonych i promieniowanych oraz badań odporności na pole elektromagnetyczne zostały wykonane w pomieszczeniach ekranowanych.		

This report consists of 56 pages, the end of this report is on 56 page / Niniejsze sprawozdanie składa się ze 56 stron, koniec sprawozdania znajduje się na 56 stronie.

In this report an indication (**K**) means that indicated data has been delivered by the Customer. The indication (**K**) used in table header, means that all data and information in given column(s) and/or row(s) has been delivered by the Customer. / W niniejszym sprawozdaniu oznaczenie (**K**) oznacza, że wskazane dane zostały dostarczone przez Klienta. Oznaczenie nagłówka tabeli oznaczeniem (**K**) wskazuje, że dane i informacje zawarte w danej kolumnie/kolumnach i/lub wierszu/wierszach zostały w całości dostarczone przez Klienta.



## II. Applied standards/methods / Normy/metody zastosowane w badaniach:

- [1] ETSI EN 300 328 V2.2.2 (2019-07) - Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonised Standard for access to radio spectrum / Szerokopasmowe systemy transmisyjne - Urządzenia transmisji danych pracujące w paśmie 2,4 GHz -- Zharmonizowana norma dotycząca dostępu do widma radiowego
- [2] ETSI TR 100 028-2 V1.3.1 (2001-03) - Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics Part 2 Kompatybilność elektromagnetyczna i zagadnienia widma radiowego (ERM); niepewności w pomiarach charakterystyk przenośnych urządzeń radiowych Część 2

Notes / Uwagi: Tests performed out of the scope of accreditation were marked as „NA” (also in the same way in the Table 1) / Badania wykonane poza zakresem akredytacji oznaczono jako „NA” (również w ten sam sposób w Tabeli 1)

**Method(s) exclusions, deviations, additions / Ograniczenia metod(y), odstępstwa, uzupełnienia**  
(only for final and development tests / tylko dla badań końcowych i rozwojowych)

**Implementation of exclusions and/or deviations and/or additions in testing methods**

Zastosowanie ograniczenia i/lub odstępstwa i/lub uzupełnienia w metodach badawczych



YES /TAK



NO / NIE

**Detailed information about implemented exclusions, deviations or additions are included in:**

Szczegółowe informacje o zastosowanych ograniczeniach, odstępstwach i uzupełnieniach w metodach badawczych zawarto w:

Notes / Uwagi: Tests performed with a deviation from the method (marked in Table 1 by following mark: \* ) and no statement of conformity was declared for them. If on the Customer's request the statement of conformity was declared, but implemented deviation could affect the test result, therefore this test result is recorded by placing a following comment: „**The test result is uncertain due to the used deviation from the testing method**”. / Badania wykonane z odstępstwem od metody (oznaczono w Tabeli 1 następującym symbolem „\*”) i nie dokonano dla nich stwierdzenia zgodności. Jeśli na życzenie Klienta została stwierdzona zgodność, a zastosowane odstępstwo mogło mieć wpływ na wynik testu, wówczas przy wyniku odnotowuje się ten fakt poprzez umieszczenie komentarza: „**Wynik testu jest niepewny z uwagi na zastosowane odstępstwo od metody testowania**”.

### III. Equipment Under Test (EUT) - details / *Badany obiekt (EUT) - szczegóły*

**Short description of the EUT**

*Krótki opis badanego obiektu EUT:*

The tested device ('Storm' device) is CR2450 battery-operated Bluetooth Low Energy Transmitter. The device is equipped with an integrated antenna. (K).

All tests were performed with battery holder installed and the CR2450 battery present. (K)

*Badane urządzenie 'Storm' jest nadajnikiem pracującym w standardzie Bluetooth Low Energy zasilanym z baterii 2450. Urządzenie wyposażone jest w antenę zintegrowaną. (K)*

*Wszystkie testy urządzenia zostały wykonane z zainstalowanym pojemnikiem na baterię i podłączoną baterią CR 2450.*

**Photo of the EUT:**

*Fotografia badanego obiektu:*



**Auxiliary Equipment (AE):**

*Urządzenie współpracujące:*

-

**Number of tested samples:**

*Liczba testowanych próbek:*

2

**Details of tested EUT Samples or EUT's components/ Szczegółowe dane testowanych egzemplarzy EUT lub elementów składowych**

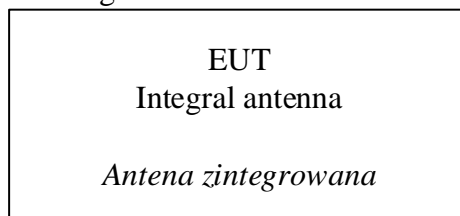
Sample No <i>Próbka nr</i>	Components <i>Składniki</i>	Serial number <i>Numer seryjny</i>	Hardware or release status <i>Status lub wydanie sprzętu (K)</i>	Software status or release <i>Status lub wydanie oprogramowania (K)</i>	Sizes, weight <i>Rozmiary, waga</i>
EUT #1, Sample #1	'Storm' (Bluetooth Low Energy Transmitter)	1140397	-	-	Approx. 45 mm x 90 mm x 30 mm, 20g
EUT #1, Sample #2	'Storm' (Bluetooth Low Energy Transmitter)	1140398	-	-	Approx. 45 mm x 90 mm x 30 mm, 20g

**Used cables (length, types, layout) corresponding to the typical use would be during normal operation / Zastosowane okablowanie (długości, typ kabli, prowadzenie i rozmieszczenie) odpowiadające typowemu, jakie stosowane będzie podczas normalnej eksploatacji.**

Cable ID	Connection <i>Przylącze</i>	Type <i>Typ</i>	Shielded <i>Ekranowanie</i>	Leads <i>Przewody</i>	Length <i>Długość</i>	Comment <i>Komentarz</i>
-	-	-	-	-	-	-

**Tested ports / Badane porty**

Port no.	Port Name <i>Nazwa</i>	Type <i>Typ</i>	Count <i>Ilość</i>	Comment <i>Komentarz</i>
1	Integral antenna <i>Antena zintegrowana</i>	PIFA <i>PIFA</i>	1	-

**EUT's configuration / Konfiguracja połączeń EUT (K)**
**Configuration #1**


During the tests, the EUT was installed in the test setup(s) at a typical configuration. For details see the pictures attached in Appendix no1.

*Podczas testów EUT zainstalowano na stanowisku badawczym w typowej konfiguracji. Szczegóły są widoczne na zdjęciach zamieszczonych w Załączniku nr 1.*





### EUT's operating modes / Tryby pracy EUT

<b>Operating mode of EUT</b> <i>Tryb pracy badanego obiektu</i>	<b>Description of EUT's operating mode</b> <i>Opis trybu pracy EUT (K)</i>	<b>Comment</b> <i>Komentarz (K)</i>
Mode A	EUT generate test signal consisting of an unmodulated carrier. <i>EUT generuje nieprzerwany niezmodulowany sygnał nośny.</i>	-

**Notes / Uwagi:** Details of the operating modes of the EUTs during tests are published in partial reports for each test in Appendix No.1 / *Szczegóły dotyczące trybów pracy EUT podczas badań są zamieszczone w raportach cząstkowych z każdego testu zamieszczonych w Załączniku Nr 1*

### Possible test case verdicts / Możliwa ocena

<b>The EUT meets the requirements</b> <i>Badany obiekt spełnia wymagania</i>	<b>P</b> <b>(PASS / Spełnia)</b>
<b>The EUT object does not meet the requirements</b> <i>Badany obiekt nie spełnia wymagań</i>	<b>F</b> <b>(FAIL / Nie spełnia)</b>

#### IV. SUMMARY OF TESTING FOR Bluetooth Low Energy Transmitter/ *Zestawienie wyników testów dla urządzenia Nadajnik Bluetooth Low Energy*

Table 1. Summary of the tests performed for EUT

No <i>Lp.</i>	Performed test <i>Wykonane badania</i>	Ref. standard <i>Przywołana norma</i> ----- Test method <i>Metoda badawcza</i>	Assessment criteria <i>Kryteria oceny</i>	EUT's tested port (K) <i>Badane przyłącze EUT (K)</i>	EUT's operation mode and conditions (K) <i>Tryb i warunki pracy EUT (K)</i>	Tested sample of EUT <i>Badana próbka</i>	Measurement uncertainty <i>Niepewność pomiarowa</i>	Test result <i>Wynik</i>	Statement of conformity <i>Stwierdzenie zgodności</i>
1.	RF output power – radiated measurement <i>Moc wyjściowa RF – pomiar promieniowany</i>	ETSI EN 300 328 [1] ----- ETSI EN 300 328, clause 5.4.2.2.2 [1]	ETSI EN 300 328, clause 4.3.2.2.3 [1]	Integral antenna <i>Antena zintegrowana</i>	Mode A, Configuration #1	Sample #1 ----- Sample #2	2.84 dB	Appendix no 1 chapter 1.5 / <i>Załącznik nr 1 rozdział 1.5</i>	Pass <i>Spełnia</i>

<sup>1)</sup> The Laboratory warrants compatibility of exposure parameters with the requirements of the basic standards / *Laboratorium gwarantuje zgodność parametrów sygnałów probierczych z wymaganiami norm podstawowych*

<sup>2)</sup> Field strength measured in the chamber during calibration (without modulation) remain at the nominal test level with the variation from 0 dB up to +6 dB / *Natężenie pola mierzone podczas kalibracji (bez modulacji) zmienia się w zakresie 0dB do +6dB względem wartości nominalnej*

<sup>3)</sup> Expanded uncertainty with coverage factor k=2 (interval having level of 95% confidence) / *Rozszerzona niepewność pomiarowa ze współczynnikiem rozszerzenia k=2 (95% poziom ufności)*

<sup>NA)</sup> not accredited method / *badanie poza zakresem akredytacji*

\* Method with exclusions, deviations, additions / *Metoda z ograniczeniami, odstępstwem, uzupełnieniem*





## V. Statment of conformity / Stwierdzenie zgodności

<b>Statement of conformity</b> of the EUT's compliance with listed standards and requirements (Table 1, row 1) as well as based on performed tests	<b>P (PASS)</b>
--	-----------------

<b>Stwierdzenie zgodności</b> badanego urządzenia z wymaganiami w zakresie wymienionych norm i wymagań (Tabela 1, wiersz 1) oraz na podstawie wykonanych testów	<b>P (SPEŁNIA)</b>
---	--------------------

**Note / Uwagi:**

The following statement of conformity to specification, standard or requirement was declared on the basis of the test results included in this report (taking into account all indicated test parameters, tested ports, limits or assessment criteria, operating modes and methods of monitoring the tested device) obtained during testing and after testing of a specific device, whose model and serial (identification) number were indicated in this report. The test results presented in this report reflect the results for this particular model and serial number.

It is the responsibility of the manufacturer to ensure that all produced models that test results carried out in accordance with the specifications defined in Table 1 of this report, are positive for each manufactured item/sample of this device model.

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*Niniejsze stwierdzenie zgodności ze specyfikacjami, normami lub wymaganiami złożono na podstawie zamieszczonych w niniejszym raporcie wyników testów (uwzględniając wszystkie wskazane parametry testów, testowane przyłącza (porty), limity lub kryteria oceny, tryby pracy i sposoby monitorowania badanego urządzenia), uzyskanych podczas testowania i po testach konkretnego egzemplarza urządzenia, którego model i numer seryjny (identyfikacyjny) wskazano w niniejszym raporcie. Wyniki testów zawarte w tym raporcie odzwierciedlają wyniki uzyskane dla tego konkretnego modelu i numeru seryjnego.*

*Producent lub importer ponosi pełną odpowiedzialność za zapewnienie, że wyniki badań wykonane zgodnie ze specyfikacją określoną w tabeli 1 niniejszego raportu, będą pozytywne dla każdego wyprodukowanego egzemplarza tego modelu urządzenia.*

*Niniejszy raport nie może być powielany inaczej niż w całości, bez pisemnej zgody laboratorium LKE.*

The statement of conformity carried out by: / Stwierdzenie zgodności przeprowadzone przez:

R. Borowiec

Robert Borowiec, Ph.D. ....

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## APPENDIX No.1 - TEST RESULTS FOR BLUETOOTH LOW ENERGY TRANSMITTER/ WYNIKI BADAŃ DLA URZĄDZENIA NADAJNIK BLUETOOTH LOW ENERGY

### 1 RF OUTPUT POWER– RAIDATED MEASUREMENT / MOC WYJŚCIOWA RF – POMIAR PROMIENIOWANY

#### 1.1 TEST PROCEDURE AND TEST CONDITIONS / PROCEDURA BADAWCZA I WARUNKI POMIARÓW

RF Output Power measurements have been carried out according to the procedure defined in ETSI EN 300 328 [1] standards as required in ETSI EN 300 328, clause 5.4.2.2.2 [1].

During measurements the EUT (Sample #1, Sample #2) was operating in following modes: Mode A.

Test conditions, detailed test parameters, tested sample of the EUT, tested ports, statement of conformity basis, EUT's operation modes and conditions are defined in details in the first part of the report as well as in the test plan delivered by the Customer (Appendix No. 2). Tests were performed under normal temperature conditions (23°C) and for device supplied with battery.

*Pomiary maksymalnej mocy wyjściowej nadajnika zostały przeprowadzone zgodnie z procedurą przedstawioną w normie ETSI EN 300 328 [1], jak wymaga tego norma ETSI EN 300 328, clause 5.4.2.2.2 [1].*

*Podczas pomiarów badany EUT (Sample #1, Sample #2) pracował w następujących trybach pracy: Mode A.*

*Warunki testu, szczegółowe parametry testu, testowana próbka EUT, testowane przyłącza, podstawy stwierdzenia zgodności, tryb pracy EUT i warunki są szczegółowo określone w pierwszej części raportu, a także w planie testów dostarczonym przez klienta (Załącznik nr 2). Pomiary przeprowadzono dla normalnych warunków temperaturowych (23°C) i dla urządzenia zasilanego z baterii.*

#### 1.2 TEST SET-UP / STANOWISKO POMIAROWE

Measurements were performed in a fully anechoic room (FAR) (Fig. 1.1). The EUT was placed in the center of the turntable on a non-conductive support. The measuring antenna which is located on spherical position measurement system was connected to a spectrum analyzer. During the transmission from EUT, the measuring antenna probed radiated field from the EUT for every azimuth and elevation angle. Step angle for elevation and azimuth was 15 degrees.

*Pomiary zostały wykonane w komorze w pełni odbiciowej FAR. (Fig. 1.1). Badany obiekt (EUT) był położony na środku dielektrycznego stołu. Antena pomiarowa umieszczona na ramieniu sferycznym skanera sferycznego podłączona była do analizatora widma. Podczas transmisji z obiektu badango, antena pomiarowa próbowała pole wokół obiektu badanego z krokiem kątowym dla elewacji i azymutu równym 15 stopni.*

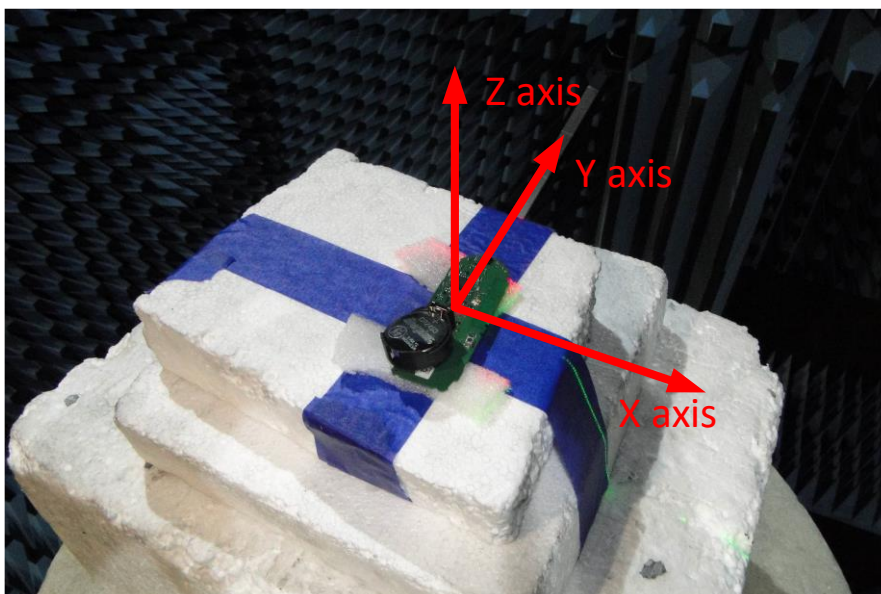


Fig. 1.1. Test setup for RF Output Power in the Fully Anechoic Room/ Stanowisko do pomiarów mocy wyjściowej RF w komorze w pełni bezodbiciowej

### 1.3 STATEMENT OF CONFORMITY BASIS / PODSTAWA STWIERDZENIA ZGODNOŚCI

Statement of conformity for this test was declared in accordance power limits defined in ETSI EN 300 328, clause 5.4.2.2.2 [1] and decision rules defined in ETSI TR 100 028-2 V1.3.1 (2001-03) technical report. The RF output power for non-FHSS equipment shall be equal to or less than 20 dBm.

*Stwierdzenia zgodności dla tego testu dokonano w odniesieniu do dopuszczalnego poziomu mocy zdefiniowanego w ETSI EN 300 328, clause 5.4.2.2.2 [1] oraz zasad podejmowania decyzji określonych w raporcie technicznym ETSI TR 100 028-2 V1.3.1 (2001-03). Moc wyjściowa RF dla urządzeń non-FHSS powinna być mniejsza lub równa 20dBm.*

### 1.4 MEASURING INSTRUMENTS / APARATURA POMIAROWA

Equipment	Manufacturer	Model	Serial No.
<input checked="" type="checkbox"/> Spectrum analyzer	Rhode-Schwarz	FSW43	1312.8000K43.103850-sc
<input checked="" type="checkbox"/> Open switch and control platform	Rohde&Schwarz	OSP120	101415
<input checked="" type="checkbox"/> Open switch and control platform	Rohde&Schwarz	OSP130	100751
<input checked="" type="checkbox"/> Open switch and control platform	Rohde&Schwarz	OSP150	100877
<input checked="" type="checkbox"/> Measuring antenna	MGV	QH800	-----
<input checked="" type="checkbox"/> Turntable and positioner controller	Maturo	NCD	NCD/163/16410515
<input checked="" type="checkbox"/> Positioner	Maturo	WPTC XL-2-HP	-----
<input checked="" type="checkbox"/> Fully-anechoic chamber	COMTEST	FAR	-----
<input checked="" type="checkbox"/> PC control with Rohde-Schwarz software EMC32			

### 1.5 TEST RESULTS / WYNIKI TESTÓW

Statement of conformity for RF Output Power measurement for the Bluetooth Low Energy Transmitter (Sample #1, Sample #2) was reported taking into account obtained measurement results for the EUT operating in Mode A as well as requirements and decision rules defined in chapter 1.3 of Appendix 1. Statement of conformity for this test was declared in Table 1 (item no. 1).

Detailed test parameters and test results obtained for the EUT Bluetooth Low Energy Transmitter, are enclosed at the end of current chapter as partial reports 141/K34/D/2023/1a ÷ 141/K34/D/2023/1g.

*Stwierdzenie zgodności dla pomiaru maksymalnej mocy wyjściowej nadajnika urządzenia Nadajnik Bluetooth Low Energy (Sample #1. Sample #2) zostało dokonane na podstawie uzyskanych wyników pomiarów EUT pracującego w trybie Mode A oraz wymagań i zasad podejmowania decyzji, określonych w rozdziale 1.3 Załącznika 1. Stwierdzenie zgodności dla niniejszego testu zostało zadeklarowane w tabeli Table 1 (poz. 1).*

*Szczegółowe parametry testów oraz uzyskane wyniki pomiarów urządzenia Nadajnik Bluetooth Low Energy zostały zamieszczone na końcu niniejszego rozdziału jako cząstkowe raporty 141/K34/D/2023/1a ÷ 141/K34/D/2023/1g.*

Table 1.1. Test result of RF Output Power measurement / Wynik pomiaru mocy wyjściowej RF

EUT	Frequency [MHz]	Power set at the control panel of the device	Measured RF Output Power [dBm]
Sample #1	2402	0	1.56
	2440	0	0.84
	2480	0	0.27
Sample #2	2402	0	0.88
	2402	8	8.03
	2440	0	0.47
	2480	0	0.02

Test performed by: Adam Jeżak MSc Eng.



## 1.6 DETAILED REPORT GENERATED BY MEASURING SYSTEM / SZCZEGÓŁOWY RAPORT GENEROWANY PRZEZ SYSTEM POMIAROWY

### 1.6.1 Partial report no. 141/K34/D/2023/1a for measurement of RF Output Power radiated power measurement of Bluetooth Low Energy Transmitter, Sample #1, 2402, Set Power 0

#### Active OTA - Total Radiated Power Test

#### Common Information

Test Description:	OTA Measurement, pattern of radiation power
Operating Conditions:	Normal, 800MHz - 6GHz - FAR Chamber
Operator Name:	Adam Jezak, Piotr Jopek, Robert Borowiec
Comment:	SS: CMW500, GSM, FSW Measurement: Max Peak - Zero Span

#### EUT Information

EUT Name:	Antena BLE
Manufacturer:	Vector
Serial Number:	SN: 1140397
Hardware Rev:	-
Software Rev:	-
Comment:	Ustawiona moc na urządzeniu 0 , płaszczyzna XY, bateria w strone masztu, Signal Number 8, 2402MHz

#### Protocol

#### OTA Auto Test Template: Active OTA\_Max-Peak

OTA Test Method:	Radiated Power Mobile Phone
Hardware Setup:	OTA Measurements\Active Antenna OTA
Mobile Phone Network:	<user defined>

TX: Zero-Span Max Peak, Resolution Bandwidth = 1 MHz	
Polarization = Hor,Ver; Azimuth = 0 - 360 deg; Elevation = 0 - (15) - 165 deg	
Radio Channel:	850 (128-251),1900 (512-810)

No measurements defined

#### Hardware Setup: OTA Measurements\Active Antenna OTA

Radiated Power Mobile Phone:	
Analyzer:	FSW43 for OTA @ VISA (ADR TCPIP0::192.168.0.50::inst0::INSTR), SN 1312.8000K43/103850, FW 5.21
Signal Path:	RadPower Vertical FSW
Signal Path2:	RadPower Horizontal FSW
Antenna:	QH800
Turntable:	Elevation @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Turn Device:	Azimuth @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Comm Tester:	<user defined>

Sensitivity Mobile Phone:	Not available
Antenna Measurement:	Not available



#### Test Information

Test Method:	Radiated Power Mobile Phone
Test Condition:	FS: Free Space
Frequency:	2402.000 MHz
Test Time:	Start: 12/8/2023 10:51:01 AM; Stop: 12/8/2023 10:58:25 AM
Cal Data Hor:	49.45 dB (FSW43 to MeasAnt1 hor 2023)
Cal Data Ver:	49.59 dB (FSW43 to MeasAnt1 ver 2023)

#### OTA Test Results for Channel 2402.000 MHz, 2402.000 MHz

OTA Evaluation Results:	
Total Radiated Power	-0.85 dBm
Peak EIRP	1.56 dBm
Directivity	2.41 dBi
Peak Gain	1.56 dBi
NHPRP 45°	-2.56 dBm
NHPRP 45° / TRP	-1.71 dB
NHPRP 45° / TRP	67.44 %
NHPRP 30°	-4.17 dBm
NHPRP 30° / TRP	-3.32 dB
NHPRP 30° / TRP	46.55 %
NHPRP 22.5°	-5.36 dBm
NHPRP 22.5° / TRP	-4.51 dB
NHPRP 22.5° / TRP	35.39 %
UHRP	-3.86 dBm
UHRP / TRP	-3.01 dB
UHRP / TRP	50.01 %
LHRP	-3.86 dBm
LHRP / TRP	-3.01 dB
LHRP / TRP	49.99 %
PGRP (0-120°)	-2.17 dBm
PGRP / TRP	-1.32 dB
PGRP / TRP	73.81 %
Front/Back Ratio	2.32
PhiBW	278.8 deg
PhiBW Up	152.2 deg
PhiBW Down	126.6 deg
ThetaBW	225.5 deg
ThetaBW Up	40.7 deg
ThetaBW Down	184.8 deg
Boresight Phi	315 deg
Boresight Theta	135 deg
Maximum Power	1.56 dBm
Minimum Power	-8.31 dBm
Average Power	-0.54 dBm
Max/Min Ratio	9.87 dB
Max/Avg Ratio	2.10 dB
Min/Avg Ratio	-7.77 dB
Worst Single Value	-22.81 dBm
Worst Position	Azi = 270 deg; Elev = 60 deg; Pol = Ver
Best Single Value	0.85 dBm
Best Position	Azi = 60 deg; Elev = 75 deg; Pol = Hor



RP\_2402.000\_tot

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.00	0.58	0.27	0.15	0.28	0.35	0.14	-0.08	-0.01
15.00	---	0.45	0.52	0.61	0.66	0.48	0.44	0.51
30.00	---	0.62	0.87	0.78	0.73	0.94	0.85	0.61
45.00	---	0.79	0.84	0.84	0.76	1.04	0.87	1.00
60.00	---	0.95	0.82	0.93	0.62	1.16	0.42	1.11
75.00	---	0.82	0.62	0.52	0.07	0.49	0.68	0.66
90.00	---	0.68	0.41	-0.07	-0.97	-0.42	-0.66	0.22
105.00	---	0.53	0.14	-0.70	-1.99	-1.86	-2.25	-1.61
120.00	---	0.38	-0.14	-0.90	-2.88	-3.94	-4.93	-4.66
135.00	---	0.30	-0.04	-0.76	-2.89	-5.39	-8.07	-8.31
150.00	---	0.22	0.05	-0.36	-2.23	-4.65	-5.98	-8.04
165.00	---	0.14	0.17	0.11	-1.65	-2.51	-3.28	-4.64
180.00	---	0.06	0.28	-0.43	-1.54	-1.83	-2.86	-2.73
195.00	---	-0.06	-0.34	-1.51	-2.35	-3.21	-2.74	-2.79
210.00	---	-0.18	-1.06	-2.70	-4.31	-5.42	-4.62	-3.49
225.00	---	-0.31	-1.55	-3.36	-5.72	-6.07	-5.95	-3.13
240.00	---	-0.44	-2.11	-3.24	-4.84	-4.84	-3.61	-2.33
255.00	---	-0.47	-1.55	-2.43	-2.97	-2.78	-2.18	-1.13
270.00	---	-0.50	-1.06	-1.56	-1.55	-1.43	-0.80	-0.32
285.00	---	-0.53	-0.67	-1.18	-0.80	-0.56	-0.39	0.08
300.00	---	-0.56	-0.31	-0.93	-0.39	-0.45	-0.03	-0.17
315.00	---	-0.34	-0.32	-0.42	-0.59	-0.21	-0.73	0.37
330.00	---	-0.13	-0.32	-0.03	-0.78	0.04	-0.73	0.53
345.00	---	0.07	-0.08	0.21	-0.33	-0.06	-0.04	-0.22
360.00	---	0.27	0.15	0.28	0.35	0.14	-0.08	-0.01

(continuation of the "RP\_2402.000\_tot" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.00	0.35	0.11	0.65	0.27
15.00	0.02	0.41	0.79	0.21
30.00	0.46	0.49	0.94	0.15
45.00	0.73	0.52	0.53	0.08
60.00	0.71	0.91	0.08	0.02
75.00	0.41	0.16	0.31	-0.74
90.00	-0.87	-0.82	0.53	-1.66
105.00	-1.52	-1.18	-0.55	-2.83
120.00	-2.86	-2.96	-1.99	-4.44
135.00	-4.86	-4.78	-1.89	-3.29
150.00	-5.77	-5.69	-1.80	-2.39
165.00	-4.19	-4.19	-1.62	-1.64
180.00	-3.21	-2.07	-1.45	-1.00
195.00	-2.37	-0.95	-1.02	-1.14
210.00	-1.98	-1.42	-0.62	-1.27
225.00	-1.80	-1.04	-0.64	-1.42
240.00	-1.43	-0.66	-0.65	-1.56
255.00	-0.72	-0.44	-1.13	-1.32
270.00	-0.04	-0.98	-1.66	-1.09
285.00	0.43	-0.09	-1.37	-0.88
300.00	0.41	1.06	-1.09	-0.67
315.00	-0.07	1.56	0.29	-0.42
330.00	-0.18	0.65	1.33	-0.18
345.00	0.45	-0.13	1.00	0.05
360.00	0.35	0.11	0.65	0.27

RP\_2402.000\_hor

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-0.29	-0.32	-0.04	0.23	0.27	-0.02	-0.73	-0.66
15.0	---	-0.58	0.29	0.57	0.51	0.31	-0.04	-0.01
30.0	---	-0.85	0.61	0.67	0.59	0.60	0.67	0.07
45.0	---	-1.15	0.10	0.57	0.63	0.75	0.66	0.61
60.0	---	-1.46	-0.47	0.25	0.42	0.85	0.22	0.75
75.0	---	-2.53	-2.09	-0.92	-0.30	0.14	0.54	0.14
90.0	---	-3.95	-4.71	-2.89	-1.78	-0.99	-0.88	-0.43
105.0	---	-6.06	-7.39	-6.31	-3.98	-3.00	-2.64	-2.59
120.0	---	-10.36	-15.66	-10.91	-8.17	-7.21	-5.77	-6.56
135.0	---	-5.88	-7.97	-10.06	-11.19	-13.04	-12.40	-12.09
150.0	---	-3.72	-5.35	-5.54	-7.44	-9.47	-9.16	-10.16
165.0	---	-2.28	-2.77	-2.30	-4.33	-4.64	-4.66	-5.56
180.0	---	-1.20	-1.16	-2.17	-3.18	-3.20	-4.14	-3.75
195.0	---	-1.77	-1.95	-3.06	-3.62	-4.46	-4.34	-4.44
210.0	---	-2.42	-2.90	-4.47	-5.65	-6.78	-7.25	-6.10
225.0	---	-3.19	-3.92	-5.29	-6.93	-6.98	-8.98	-5.98
240.0	---	-4.12	-5.26	-4.73	-5.33	-5.22	-4.70	-4.80
255.0	---	-4.03	-4.11	-3.18	-3.02	-2.95	-2.88	-2.81
270.0	---	-3.94	-3.19	-2.06	-1.58	-1.57	-1.41	-1.48
285.0	---	-3.85	-2.34	-1.58	-0.87	-0.79	-0.86	-0.94
300.0	---	-3.77	-1.63	-1.27	-0.58	-0.74	-0.47	-1.23
315.0	---	-2.62	-1.34	-0.73	-0.82	-0.46	-1.31	-0.63
330.0	---	-1.71	-1.07	-0.24	-0.98	-0.18	-1.26	-0.70
345.0	---	-0.96	-0.52	0.09	-0.45	-0.26	-0.64	-1.26
360.0	---	-0.32	-0.04	0.23	0.27	-0.02	-0.73	-0.66

(continuation of the "RP\_2402.000\_hor" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-0.90	-0.61	-1.07	-0.40
15.0	-0.76	-0.07	-0.07	-0.41
30.0	0.02	0.20	0.73	-0.43
45.0	0.44	0.34	0.19	-0.44
60.0	0.43	0.60	-0.44	-0.45
75.0	0.00	-0.49	-0.96	-1.68
90.0	-1.55	-2.19	-1.55	-3.40
105.0	-2.97	-3.69	-4.05	-6.27
120.0	-6.08	-8.14	-10.58	-18.51
135.0	-10.33	-14.31	-8.61	-7.62
150.0	-8.40	-10.41	-7.25	-4.79
165.0	-4.48	-5.09	-3.57	-3.09
180.0	-3.50	-2.64	-1.60	-1.87
195.0	-3.51	-1.96	-2.13	-2.29
210.0	-4.90	-4.36	-2.73	-2.74
225.0	-5.98	-4.69	-3.00	-3.26
240.0	-5.14	-4.10	-3.28	-3.84
255.0	-3.24	-3.16	-4.15	-4.03
270.0	-1.71	-2.91	-5.22	-4.23
285.0	-1.09	-1.74	-4.37	-4.44
300.0	-1.26	-0.92	-3.66	-4.66
315.0	-1.73	-1.84	-3.17	-3.15
330.0	-1.59	-2.65	-2.74	-2.03
345.0	-0.77	-2.24	-1.82	-1.14
360.0	-0.90	-0.61	-1.07	-0.40

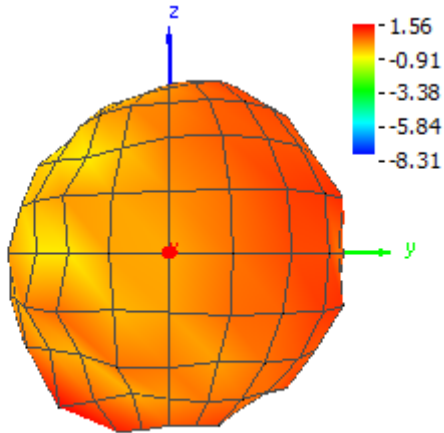
RP\_2402.000\_ver

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-6.85	-8.74	-13.57	-19.52	-17.05	-14.35	-8.65	-8.60
15.0	---	-6.32	-12.37	-19.70	-13.96	-13.81	-9.33	-8.95
30.0	---	-4.78	-11.42	-15.56	-14.47	-10.33	-13.10	-8.65
45.0	---	-3.64	-7.20	-11.50	-14.39	-10.91	-12.32	-9.67
60.0	---	-2.74	-5.09	-7.48	-12.83	-10.44	-13.03	-9.89
75.0	---	-1.88	-2.71	-4.96	-10.75	-10.58	-14.34	-8.80
90.0	---	-1.16	-1.18	-3.29	-8.66	-9.51	-13.60	-8.36
105.0	---	-0.54	-0.70	-2.10	-6.34	-8.24	-12.95	-8.54
120.0	---	0.00	-0.27	-1.36	-4.41	-6.70	-12.46	-9.17
135.0	---	-0.90	-0.81	-1.31	-3.58	-6.21	-10.06	-10.66
150.0	---	-2.02	-1.42	-1.92	-3.79	-6.38	-8.82	-12.17
165.0	---	-3.55	-2.92	-3.60	-5.01	-6.64	-8.93	-11.85
180.0	---	-5.92	-5.23	-5.25	-6.56	-7.50	-8.77	-9.52
195.0	---	-4.93	-5.44	-6.74	-8.30	-9.20	-7.85	-7.79
210.0	---	-4.13	-5.65	-7.46	-10.09	-11.14	-8.05	-6.94
225.0	---	-3.45	-5.31	-7.80	-11.86	-13.30	-8.95	-6.30
240.0	---	-2.87	-4.99	-8.63	-14.50	-15.69	-10.15	-5.96
255.0	---	-2.99	-5.08	-10.43	-21.96	-17.01	-10.45	-6.07
270.0	---	-3.12	-5.16	-11.17	-22.81	-16.23	-9.64	-6.60
285.0	---	-3.25	-5.61	-11.75	-18.84	-13.49	-10.29	-6.73
300.0	---	-3.38	-6.12	-12.09	-14.29	-12.26	-10.15	-6.78
315.0	---	-4.23	-7.10	-12.07	-13.41	-12.80	-9.76	-6.49
330.0	---	-5.28	-8.36	-13.31	-14.29	-12.94	-10.12	-5.54
345.0	---	-6.67	-10.23	-15.46	-15.97	-13.49	-8.90	-6.95
360.0	---	-8.74	-13.57	-19.52	-17.05	-14.35	-8.65	-8.60

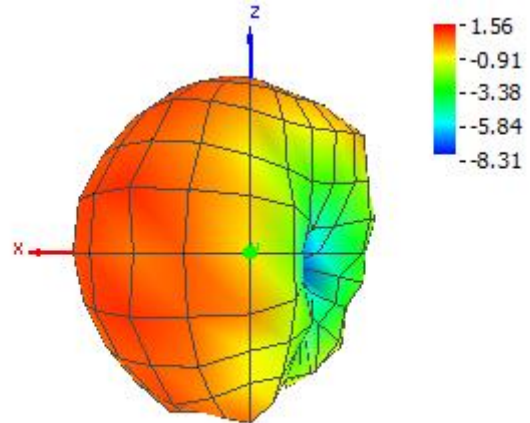
(continuation of the "RP\_2402.000\_ver" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-5.67	-8.06	-4.21	-8.19
15.0	-7.86	-9.40	-6.62	-8.54
30.0	-9.71	-11.39	-12.50	-8.93
45.0	-11.13	-13.54	-10.64	-9.35
60.0	-11.26	-10.76	-9.34	-9.83
75.0	-10.05	-8.44	-5.64	-7.84
90.0	-9.31	-6.49	-3.67	-6.48
105.0	-6.98	-4.76	-3.12	-5.45
120.0	-5.67	-4.53	-2.64	-4.61
135.0	-6.31	-5.30	-2.93	-5.30
150.0	-9.19	-7.48	-3.25	-6.11
165.0	-16.08	-11.47	-6.04	-7.11
180.0	-15.11	-11.18	-16.01	-8.42
195.0	-8.72	-7.76	-7.47	-7.47
210.0	-5.08	-4.50	-4.77	-6.69
225.0	-3.90	-3.48	-4.41	-6.03
240.0	-3.84	-3.28	-4.08	-5.46
255.0	-4.28	-3.77	-4.13	-4.66
270.0	-4.99	-5.42	-4.19	-3.98
285.0	-4.84	-5.08	-4.38	-3.40
300.0	-4.56	-3.30	-4.59	-2.88
315.0	-5.05	-1.09	-2.32	-3.72
330.0	-5.73	-2.10	-0.84	-4.77
345.0	-5.66	-4.27	-2.20	-6.15
360.0	-5.67	-8.06	-4.21	-8.19

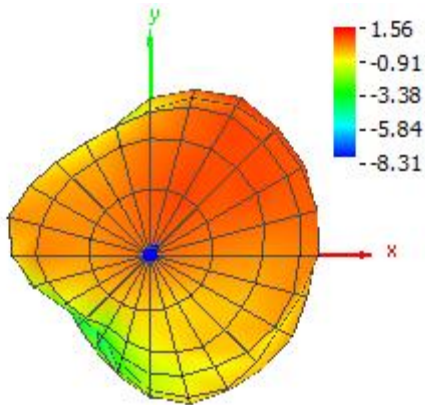
Theta = 90, Phi = 0



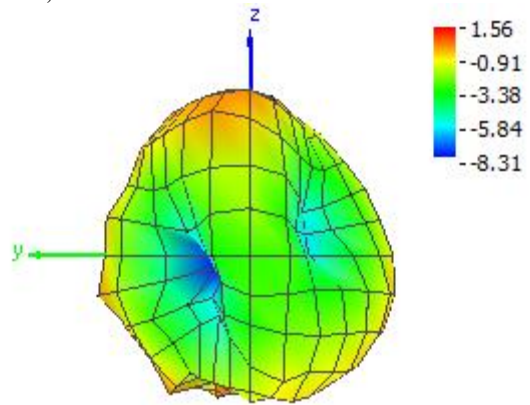
Theta = 90, Phi = 90



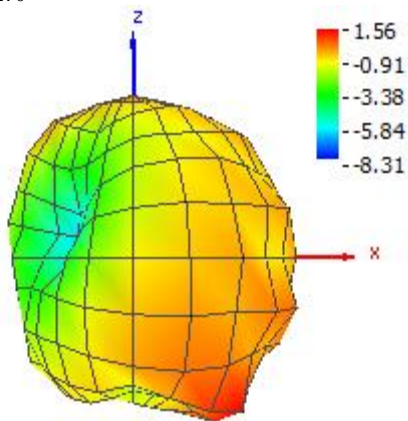
Theta = 0, Phi = 0



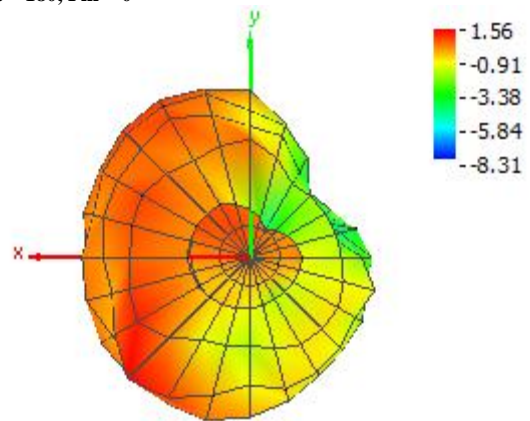
Theta = 90, Phi = 180



Theta = 90, Phi = 270



Theta = 180, Phi = 0





### 1.6.2 Partial report no. 141/K34/D/2023/1b for measurement of RF Output Power radiated power measurement of Bluetooth Low Energy Transmitter, Sample #2, 2402, Set Power 0

#### Active OTA - Total Radiated Power Test

##### Common Information

Test Description:	OTA Measurement, pattern of radiation power
Operating Conditions:	Normal, 800MHz - 6GHz - FAR Chamber
Operator Name:	Adam Jezak, Piotr Jopek, Robert Borowiec
Comment:	SS: CMW500, GSM, FSW Measurement: Max Peak - Zero Span

##### EUT Information

EUT Name:	Antena BLE
Manufacturer:	Vector
Serial Number:	SN: 1140398
Hardware Rev:	-
Software Rev:	-
Comment:	Ustawiona moc na urządzeniu 0, płaszczyzna XY, bateria w strone masztu, Signal Number 8, 2402MHz

##### Protocol

##### OTA Auto Test Template: Active OTA\_Max-Peak

OTA Test Method:	Radiated Power Mobile Phone
Hardware Setup:	OTA Measurements\Active Antenna OTA
Mobile Phone Network:	<user defined>

TX: Zero-Span Max Peak, Resolution Bandwidth = 1 MHz
Polarization = Hor,Ver; Azimuth = 0 - 360 deg; Elevation = 0 - (15) - 165 deg
Radio Channel: 850 (128-251),1900 (512-810)

No measurements defined

##### Hardware Setup: OTA Measurements\Active Antenna OTA

Radiated Power Mobile Phone:	
Analyzer:	FSW43 for OTA @ VISA (ADR TCPIP0::192.168.0.50::inst0::INSTR), SN 1312.8000K43/103850, FW 5.21
Signal Path:	RadPower Vertical FSW
Signal Path2:	RadPower Horizontal FSW
Antenna:	QH800
Turntable:	Elevation @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Turn Device:	Azimuth @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Comm Tester:	<user defined>

Sensitivity Mobile Phone:	Not available
Antenna Measurement:	Not available



#### Test Information

Test Method:	Radiated Power Mobile Phone
Test Condition:	FS: Free Space
Frequency:	2402.000 MHz
Test Time:	Start: 12/8/2023 12:20:27 PM; Stop: 12/8/2023 12:27:53 PM
Cal Data Hor:	49.45 dB (FSW43 to MeasAnt1 hor 2023)
Cal Data Ver:	49.59 dB (FSW43 to MeasAnt1 ver 2023)

#### OTA Test Results for Channel 2402.000 MHz, 2402.000 MHz

OTA Evaluation Results:	
Total Radiated Power	-1.41 dBm
Peak EIRP	0.88 dBm
Directivity	2.30 dBi
Peak Gain	0.88 dBi
NHPRP 45°	-3.09 dBm
NHPRP 45° / TRP	-1.68 dB
NHPRP 45° / TRP	68.00 %
NHPRP 30°	-4.70 dBm
NHPRP 30° / TRP	-3.28 dB
NHPRP 30° / TRP	46.94 %
NHPRP 22.5°	-5.89 dBm
NHPRP 22.5° / TRP	-4.48 dB
NHPRP 22.5° / TRP	35.68 %
UHRP	-4.44 dBm
UHRP / TRP	-3.03 dB
UHRP / TRP	49.77 %
LHRP	-4.40 dBm
LHRP / TRP	-2.99 dB
LHRP / TRP	50.23 %
PGRP (0-120°)	-2.73 dBm
PGRP / TRP	-1.32 dB
PGRP / TRP	73.83 %
Front/Back Ratio	6.06
PhiBW	214.7 deg
PhiBW Up	45.1 deg
PhiBW Down	169.7 deg
ThetaBW	218.6 deg
ThetaBW Up	87.7 deg
ThetaBW Down	130.9 deg
Boresight Phi	60 deg
Boresight Theta	105 deg
Maximum Power	0.88 dBm
Minimum Power	-10.08 dBm
Average Power	-1.13 dBm
Max/Min Ratio	10.96 dB
Max/Avg Ratio	2.02 dB
Min/Avg Ratio	-8.95 dB
Worst Single Value	-27.92 dBm
Worst Position	Azi = 120 deg; Elev = 165 deg; Pol = Hor
Best Single Value	0.62 dBm
Best Position	Azi = 60 deg; Elev = 105 deg; Pol = Hor

RP\_2402.000\_tot

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.00	-0.04	-0.43	-0.45	-0.23	-0.30	-0.50	-0.75	-0.68
15.00	---	-0.25	-0.08	0.07	0.06	-0.02	-0.06	-0.02
30.00	---	-0.08	0.26	0.29	0.25	0.52	0.54	0.25
45.00	---	0.08	0.14	0.43	0.43	0.66	0.67	0.80
60.00	---	0.24	0.01	0.47	0.35	0.84	0.37	0.88
75.00	---	0.08	-0.29	0.02	-0.29	0.10	0.46	0.50
90.00	---	-0.10	-0.62	-0.64	-1.37	-0.83	-1.05	-0.13
105.00	---	-0.28	-0.88	-1.35	-2.77	-2.56	-2.69	-2.11
120.00	---	-0.47	-1.16	-1.70	-4.13	-5.09	-6.22	-5.22
135.00	---	-0.55	-1.11	-1.66	-4.09	-6.51	-10.08	-8.36
150.00	---	-0.63	-1.07	-1.27	-2.99	-5.40	-6.42	-7.42
165.00	---	-0.71	-0.85	-0.59	-2.12	-3.21	-3.40	-4.62
180.00	---	-0.80	-0.64	-0.98	-2.23	-2.49	-3.52	-3.09
195.00	---	-0.89	-1.11	-1.88	-3.11	-4.04	-4.13	-3.49
210.00	---	-0.99	-1.64	-2.93	-4.77	-6.81	-6.30	-4.68
225.00	---	-1.09	-2.04	-3.41	-5.89	-6.99	-7.26	-4.29
240.00	---	-1.19	-2.47	-3.27	-4.97	-5.18	-4.21	-3.14
255.00	---	-1.23	-2.01	-2.59	-3.08	-3.04	-2.45	-1.66
270.00	---	-1.27	-1.59	-1.79	-1.81	-1.75	-1.19	-0.80
285.00	---	-1.31	-1.27	-1.47	-1.17	-1.04	-0.78	-0.47
300.00	---	-1.35	-0.97	-1.27	-0.90	-0.99	-0.61	-0.78
315.00	---	-1.10	-1.08	-0.82	-1.18	-0.83	-1.45	-0.38
330.00	---	-0.87	-1.19	-0.56	-1.43	-0.68	-1.55	-0.25
345.00	---	-0.65	-0.81	-0.38	-0.99	-0.82	-0.87	-1.12
360.00	---	-0.43	-0.45	-0.23	-0.30	-0.50	-0.75	-0.68

(continuation of the "RP\_2402.000\_tot" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.00	-0.42	-0.63	-0.21	-0.31
15.00	-0.58	-0.28	0.03	-0.34
30.00	0.09	-0.06	0.25	-0.36
45.00	0.45	0.12	-0.02	-0.39
60.00	0.49	0.45	-0.31	-0.42
75.00	0.23	-0.13	-0.24	-1.15
90.00	-1.31	-1.05	-0.17	-2.04
105.00	-2.21	-1.90	-1.20	-3.15
120.00	-3.68	-3.65	-2.54	-4.65
135.00	-5.39	-5.15	-2.19	-3.58
150.00	-5.50	-5.54	-1.86	-2.72
165.00	-3.86	-4.25	-1.68	-2.00
180.00	-3.32	-2.45	-1.51	-1.38
195.00	-2.92	-1.49	-1.29	-1.59
210.00	-2.87	-2.01	-1.09	-1.80
225.00	-2.67	-1.66	-1.09	-2.02
240.00	-2.09	-1.31	-1.09	-2.26
255.00	-1.25	-1.13	-1.70	-2.07
270.00	-0.48	-1.55	-2.41	-1.89
285.00	-0.11	-0.69	-2.19	-1.72
300.00	-0.18	0.35	-1.98	-1.55
315.00	-0.80	0.68	-0.61	-1.21
330.00	-1.00	-0.25	0.44	-0.89
345.00	-0.29	-0.97	0.12	-0.59
360.00	-0.42	-0.63	-0.21	-0.31



RP 2402.000 hor

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-0.59	-0.83	-0.53	-0.32	-0.34	-0.62	-1.18	-1.11
15.0	---	-1.13	-0.18	0.02	-0.10	-0.16	-0.41	-0.36
30.0	---	-1.45	0.13	0.21	0.12	0.23	0.42	-0.11
45.0	---	-1.80	-0.40	0.23	0.34	0.42	0.53	0.53
60.0	---	-2.18	-1.00	-0.14	0.21	0.61	0.18	0.62
75.0	---	-3.28	-2.73	-1.24	-0.57	-0.14	0.37	0.06
90.0	---	-4.75	-5.64	-3.12	-1.99	-1.17	-1.25	-0.69
105.0	---	-6.99	-8.35	-6.77	-4.42	-3.32	-3.01	-3.04
120.0	---	-11.87	-17.20	-11.25	-8.73	-7.76	-7.04	-6.99
135.0	---	-6.52	-8.38	-9.97	-10.78	-12.33	-13.74	-11.04
150.0	---	-4.20	-5.66	-5.51	-6.79	-8.48	-8.08	-8.48
165.0	---	-2.69	-3.26	-2.27	-3.95	-4.55	-4.05	-5.12
180.0	---	-1.58	-1.72	-2.09	-3.25	-3.29	-4.18	-3.83
195.0	---	-2.27	-2.46	-3.00	-4.02	-4.70	-5.19	-4.92
210.0	---	-3.11	-3.35	-4.83	-6.04	-7.57	-8.27	-7.15
225.0	---	-4.14	-4.51	-5.78	-7.25	-7.45	-9.38	-6.74
240.0	---	-5.49	-6.10	-5.24	-5.60	-5.31	-4.74	-5.01
255.0	---	-5.40	-5.14	-3.69	-3.23	-3.07	-2.77	-2.83
270.0	---	-5.31	-4.35	-2.56	-1.89	-1.78	-1.46	-1.57
285.0	---	-5.22	-3.34	-2.04	-1.24	-1.12	-1.01	-1.09
300.0	---	-5.13	-2.51	-1.70	-1.00	-1.10	-0.82	-1.42
315.0	---	-3.60	-2.17	-1.15	-1.30	-0.91	-1.70	-1.03
330.0	---	-2.47	-1.86	-0.77	-1.50	-0.75	-1.82	-1.09
345.0	---	-1.57	-1.14	-0.50	-1.02	-0.91	-1.27	-1.80
360.0	---	-0.83	-0.53	-0.32	-0.34	-0.62	-1.18	-1.11

(continuation of the "RP\_2402.000\_hor" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-1.29	-1.06	-1.45	-0.70
15.0	-1.09	-0.53	-0.57	-0.80
30.0	-0.20	-0.20	0.15	-0.90
45.0	0.26	0.00	-0.36	-1.00
60.0	0.29	0.17	-0.94	-1.10
75.0	-0.11	-0.85	-1.80	-2.35
90.0	-2.00	-2.63	-2.89	-4.10
105.0	-3.81	-5.13	-5.58	-7.10
120.0	-7.54	-9.51	-14.07	-27.92
135.0	-11.04	-12.34	-8.19	-8.07
150.0	-7.38	-8.45	-5.77	-5.08
165.0	-4.01	-4.87	-3.25	-3.33
180.0	-3.62	-3.03	-1.66	-2.08
195.0	-4.11	-2.69	-2.63	-2.69
210.0	-5.93	-5.54	-3.90	-3.40
225.0	-6.85	-5.77	-3.99	-4.24
240.0	-5.34	-4.77	-4.09	-5.29
255.0	-3.20	-3.45	-4.68	-5.08
270.0	-1.69	-2.92	-5.35	-4.89
285.0	-1.18	-1.83	-4.57	-4.70
300.0	-1.36	-1.12	-3.91	-4.52
315.0	-1.99	-1.98	-3.21	-3.21
330.0	-2.02	-2.82	-2.61	-2.20
345.0	-1.14	-2.57	-1.99	-1.39
360.0	-1.29	-1.06	-1.45	-0.70

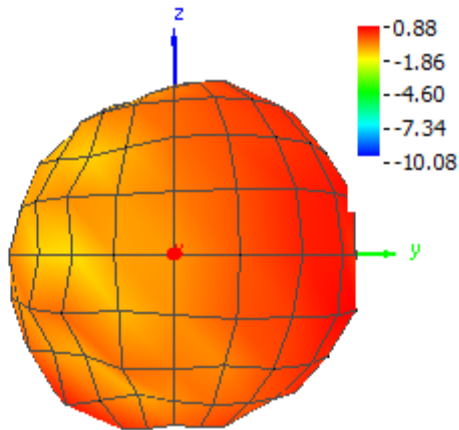
RP\_2402.000\_ver

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-9.23	-11.05	-18.21	-17.07	-20.34	-16.17	-11.02	-10.96
15.0	---	-7.64	-16.49	-19.57	-14.31	-15.14	-11.19	-11.19
30.0	---	-5.76	-15.26	-17.19	-15.38	-11.33	-14.79	-10.85
45.0	---	-4.45	-9.23	-12.85	-16.23	-12.01	-14.33	-11.34
60.0	---	-3.44	-6.80	-8.33	-14.72	-12.14	-13.37	-11.38
75.0	---	-2.62	-3.96	-5.98	-12.35	-12.66	-16.33	-9.71
90.0	---	-1.92	-2.26	-4.26	-10.09	-12.00	-14.45	-9.25
105.0	---	-1.32	-1.74	-2.82	-7.76	-10.53	-14.17	-9.27
120.0	---	-0.80	-1.27	-2.21	-5.98	-8.48	-13.88	-9.98
135.0	---	-1.82	-2.02	-2.36	-5.14	-7.83	-12.53	-11.74
150.0	---	-3.15	-2.92	-3.31	-5.34	-8.34	-11.41	-14.07
165.0	---	-5.08	-4.56	-5.54	-6.74	-8.98	-11.98	-14.30
180.0	---	-8.65	-7.22	-7.43	-9.01	-10.23	-12.01	-11.15
195.0	---	-6.54	-6.85	-8.33	-10.36	-12.58	-10.77	-9.03
210.0	---	-5.13	-6.51	-7.43	-10.72	-14.77	-10.69	-8.31
225.0	---	-4.06	-5.66	-7.18	-11.57	-16.95	-11.39	-7.96
240.0	---	-3.21	-4.94	-7.66	-13.70	-20.58	-13.59	-7.70
255.0	---	-3.33	-4.90	-9.08	-17.74	-25.50	-14.01	-7.89
270.0	---	-3.45	-4.85	-9.70	-19.03	-23.90	-13.38	-8.69
285.0	---	-3.58	-5.48	-10.55	-19.13	-18.79	-13.72	-9.18
300.0	---	-3.70	-6.22	-11.52	-17.03	-16.95	-13.84	-9.41
315.0	---	-4.70	-7.62	-12.09	-17.09	-17.97	-13.96	-8.95
330.0	---	-5.98	-9.69	-13.86	-19.32	-18.41	-13.85	-7.83
345.0	---	-7.81	-12.13	-15.98	-22.93	-17.49	-11.45	-9.50
360.0	---	-11.05	-18.21	-17.07	-20.34	-16.17	-11.02	-10.96

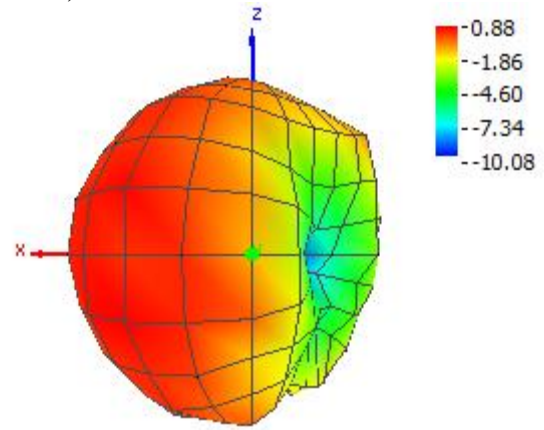
(continuation of the "RP\_2402.000\_ver" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-7.87	-10.83	-6.28	-10.99
15.0	-10.10	-12.70	-8.86	-10.32
30.0	-11.85	-14.86	-16.13	-9.74
45.0	-13.24	-15.63	-11.26	-9.22
60.0	-12.93	-11.49	-9.03	-8.77
75.0	-10.94	-8.29	-5.44	-7.33
90.0	-9.63	-6.20	-3.50	-6.25
105.0	-7.31	-4.71	-3.17	-5.39
120.0	-5.98	-4.95	-2.86	-4.67
135.0	-6.77	-6.07	-3.44	-5.48
150.0	-10.04	-8.66	-4.12	-6.48
165.0	-18.36	-13.03	-6.87	-7.78
180.0	-15.17	-11.47	-16.21	-9.64
195.0	-9.13	-7.68	-7.05	-8.07
210.0	-5.84	-4.56	-4.31	-6.92
225.0	-4.76	-3.79	-4.21	-6.01
240.0	-4.87	-3.92	-4.11	-5.26
255.0	-5.67	-4.97	-4.74	-5.08
270.0	-6.63	-7.21	-5.48	-4.92
285.0	-6.71	-7.05	-5.93	-4.76
300.0	-6.43	-5.06	-6.43	-4.60
315.0	-6.99	-2.71	-4.06	-5.53
330.0	-7.80	-3.74	-2.54	-6.72
345.0	-7.77	-6.09	-4.02	-8.35
360.0	-7.87	-10.83	-6.28	-10.99

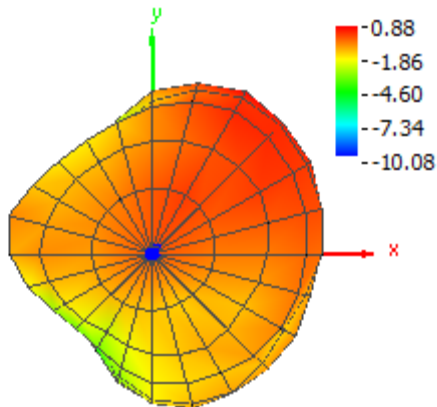
**Theta = 90, Phi = 0**



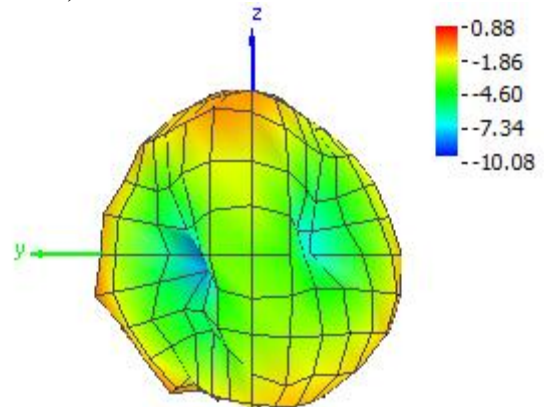
**Theta = 90, Phi = 90**



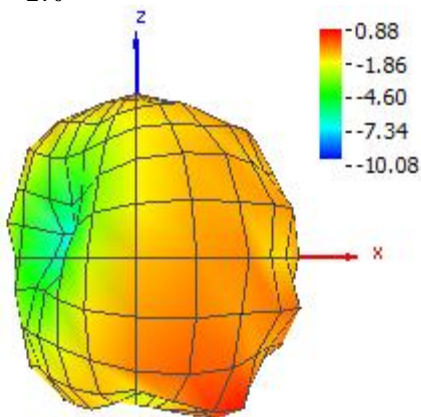
**Theta = 0, Phi = 0**



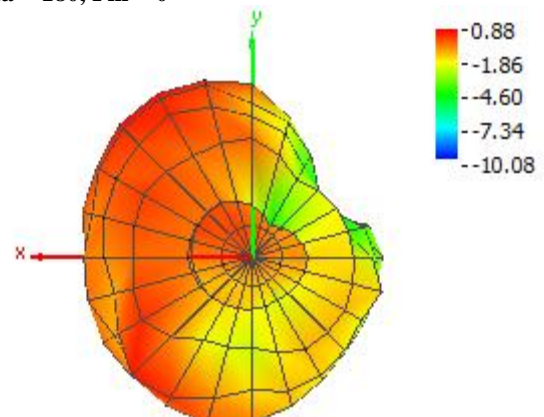
**Theta = 90, Phi = 180**



**Theta = 90, Phi = 270**



**Theta = 180, Phi = 0**





### 1.6.3 Partial report no. 141/K34/D/2023/1c for measurement of RF Output Power radiated power measurement of Bluetooth Low Energy Transmitter, Sample #2, 2402, Set Power 8

#### Active OTA - Total Radiated Power Test

#### Common Information

Test Description:	OTA Measurement, pattern of radiation power
Operating Conditions:	Normal, 800MHz - 6GHz - FAR Chamber
Operator Name:	Adam Jezak, Piotr Jopek, Robert Borowiec
Comment:	SS: CMW500, GSM, FSW Measurement: Max Peak - Zero Span

#### EUT Information

EUT Name:	Antena BLE
Manufacturer:	Vector
Serial Number:	1140398
Hardware Rev:	-
Software Rev:	-
Comment:	Ustawiona moc na urządzeniu 8, płaszczyzna XY, bateria w stronę masztu, 2402MHz, signal number 8

#### Protocol

#### OTA Auto Test Template: Active OTA\_Max-Peak

OTA Test Method:	Radiated Power Mobile Phone
Hardware Setup:	OTA Measurements\Active Antenna OTA
Mobile Phone Network:	<user defined>

TX: Zero-Span Max Peak, Resolution Bandwidth = 1 MHz	
Polarization = Hor,Ver; Azimuth = 0 - 360 deg; Elevation = 0 - (15) - 165 deg	
Radio Channel:	850 (128-251),1900 (512-810)

No measurements defined

#### Hardware Setup: OTA Measurements\Active Antenna OTA

Radiated Power Mobile Phone:	
Analyzer:	FSW43 for OTA @ VISA (ADR TCPIP0::192.168.0.50::inst0::INSTR), SN 1312.8000K43/103850, FW 5.21
Signal Path:	RadPower Vertical FSW
Signal Path2:	RadPower Horizontal FSW
Antenna:	QH800
Turntable:	Elevation @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Turn Device:	Azimuth @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Comm Tester:	<user defined>

Sensitivity Mobile Phone:	Not available
Antenna Measurement:	Not available
Conducted MIMO:	Not available



### Test Information

Test Method:	Radiated Power Mobile Phone
Test Condition:	FS: Free Space
Frequency:	2402.000 MHz
Test Time:	Start: 12/8/2023 12:42:50 PM; Stop: 12/8/2023 12:50:16 PM
Cal Data Hor:	49.45 dB (FSW43 to MeasAnt1 hor 2023)
Cal Data Ver:	49.59 dB (FSW43 to MeasAnt1 ver 2023)

### OTA Test Results for Channel 2402.000 MHz, 2402.000 MHz

OTA Evaluation Results:	
Total Radiated Power	5.76 dBm
Peak EIRP	8.03 dBm
Directivity	2.27 dBi
Peak Gain	8.03 dBi
NHPRP 45°	4.08 dBm
NHPRP 45° / TRP	-1.69 dB
NHPRP 45° / TRP	67.83 %
NHPRP 30°	2.47 dBm
NHPRP 30° / TRP	-3.30 dB
NHPRP 30° / TRP	46.83 %
NHPRP 22.5°	1.29 dBm
NHPRP 22.5° / TRP	-4.47 dB
NHPRP 22.5° / TRP	35.69 %
UHRP	2.74 dBm
UHRP / TRP	-3.02 dB
UHRP / TRP	49.87 %
LHRP	2.76 dBm
LHRP / TRP	-3.00 dB
LHRP / TRP	50.13 %
PGRP (0-120°)	4.44 dBm
PGRP / TRP	-1.33 dB
PGRP / TRP	73.68 %
Front/Back Ratio	6.01
PhiBW	212.7 deg
PhiBW Up	45.9 deg
PhiBW Down	166.8 deg
ThetaBW	218.0 deg
ThetaBW Up	87.6 deg
ThetaBW Down	130.4 deg
Boresight Phi	60 deg
Boresight Theta	105 deg
Maximum Power	8.03 dBm
Minimum Power	-3.59 dBm
Average Power	6.08 dBm
Max/Min Ratio	11.62 dB
Max/Avg Ratio	1.95 dB
Min/Avg Ratio	-9.68 dB
Worst Single Value	-17.41 dBm
Worst Position	Azi = 255 deg; Elev = 75 deg; Pol = Ver
Best Single Value	7.83 dBm
Best Position	Azi = 60 deg; Elev = 75 deg; Pol = Hor

RP\_2402.000\_tot

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.00	7.37	6.95	6.71	6.85	6.80	6.74	6.38	6.52
15.00	---	7.10	7.15	7.19	7.24	7.24	6.98	7.27
30.00	---	7.25	7.55	7.44	7.53	7.76	7.82	7.30
45.00	---	7.39	7.38	7.60	7.75	7.91	7.97	7.91
60.00	---	7.53	7.20	7.60	7.64	8.02	7.64	8.03
75.00	---	7.37	6.91	7.14	6.93	7.27	7.79	7.64
90.00	---	7.20	6.60	6.47	5.78	6.30	6.24	7.08
105.00	---	7.03	6.28	5.73	4.22	4.58	4.56	5.21
120.00	---	6.84	5.93	5.42	2.71	1.94	0.90	2.26
135.00	---	6.77	5.98	5.47	2.80	0.71	-3.59	-1.01
150.00	---	6.68	6.03	5.83	4.18	2.01	0.33	-0.35
165.00	---	6.60	6.25	6.44	5.27	3.85	4.03	2.03
180.00	---	6.52	6.47	6.17	4.97	4.59	3.91	3.72
195.00	---	6.45	6.04	5.37	3.78	3.25	2.40	3.63
210.00	---	6.39	5.56	4.14	2.24	0.24	0.66	2.43
225.00	---	6.32	5.05	3.69	1.30	-0.13	0.04	2.62
240.00	---	6.26	4.48	3.95	2.20	2.02	3.28	3.66
255.00	---	6.20	4.93	4.74	4.06	4.18	5.02	5.21
270.00	---	6.14	5.34	5.44	5.32	5.48	6.14	6.26
285.00	---	6.08	5.62	5.76	5.94	6.25	6.40	6.70
300.00	---	6.02	5.87	5.98	6.15	6.35	6.56	6.38
315.00	---	6.27	5.79	6.44	5.90	6.47	5.82	6.63
330.00	---	6.51	5.71	6.65	5.77	6.43	5.76	6.81
345.00	---	6.74	6.24	6.77	6.23	6.34	6.38	6.03
360.00	---	6.95	6.71	6.85	6.80	6.74	6.38	6.52

(continuation of the "RP\_2402.000\_tot" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.00	6.64	6.50	7.05	6.69
15.00	6.58	6.80	7.06	6.86
30.00	7.27	7.18	7.07	7.03
45.00	7.63	7.60	7.00	7.19
60.00	7.67	7.95	6.93	7.34
75.00	7.39	7.29	7.02	6.60
90.00	5.83	6.35	7.12	5.71
105.00	4.75	5.73	6.16	4.59
120.00	3.11	4.04	4.94	3.08
135.00	1.56	2.43	5.01	3.90
150.00	1.75	1.69	5.08	4.58
165.00	3.34	2.86	5.37	5.18
180.00	4.05	4.48	5.65	5.70
195.00	3.66	5.41	5.77	5.50
210.00	3.70	5.10	5.89	5.28
225.00	4.12	5.47	5.99	5.06
240.00	4.89	5.92	6.08	4.83
255.00	5.84	6.31	5.51	5.02
270.00	6.64	6.85	4.85	5.21
285.00	6.90	6.54	4.88	5.39
300.00	6.89	7.51	4.91	5.56
315.00	6.30	8.03	6.51	5.87
330.00	6.09	7.16	7.67	6.16
345.00	6.80	6.38	7.37	6.44
360.00	6.64	6.50	7.05	6.69

RP\_2402.000\_hor

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	6.85	6.59	6.63	6.78	6.74	6.62	6.01	6.06
15.0	---	6.27	7.07	7.16	7.06	7.08	6.70	6.94
30.0	---	5.92	7.48	7.37	7.40	7.42	7.71	7.00
45.0	---	5.54	6.89	7.41	7.66	7.67	7.81	7.66
60.0	---	5.13	6.21	7.08	7.52	7.83	7.47	7.77
75.0	---	4.02	4.47	5.97	6.71	7.09	7.67	7.20
90.0	---	2.53	1.53	4.07	5.24	6.06	6.05	6.51
105.0	---	0.23	-1.41	0.39	2.75	4.04	4.24	4.24
120.0	---	-4.93	-16.18	-4.39	-1.66	-0.25	0.06	0.38
135.0	---	0.73	-1.00	-3.53	-3.97	-4.53	-8.34	-3.68
150.0	---	3.10	1.94	1.14	0.39	-1.00	-1.79	-1.19
165.0	---	4.63	3.99	4.52	3.43	2.37	3.22	1.68
180.0	---	5.76	5.37	4.99	3.98	3.68	3.25	3.05
195.0	---	5.06	4.61	4.36	2.78	2.52	1.35	2.18
210.0	---	4.23	3.68	2.30	0.85	-0.51	-1.22	-0.28
225.0	---	3.20	2.46	1.13	-0.23	-0.55	-2.42	0.13
240.0	---	1.84	0.76	1.76	1.46	1.88	2.45	2.01
255.0	---	1.94	1.67	3.54	3.92	4.15	4.54	4.25
270.0	---	2.05	2.43	4.65	5.27	5.46	5.78	5.61
285.0	---	2.15	3.47	5.20	5.90	6.18	6.11	6.15
300.0	---	2.25	4.31	5.59	6.08	6.24	6.31	5.76
315.0	---	3.80	4.71	6.15	5.83	6.40	5.50	5.98
330.0	---	4.94	5.09	6.46	5.72	6.36	5.42	5.98
345.0	---	5.84	5.92	6.66	6.21	6.24	5.97	5.29
360.0	---	6.59	6.63	6.78	6.74	6.62	6.01	6.06

(continuation of the "RP\_2402.000\_hor" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	5.77	6.00	5.92	6.27
15.0	6.01	6.54	6.46	6.36
30.0	6.98	7.03	6.93	6.45
45.0	7.46	7.42	6.61	6.54
60.0	7.49	7.57	6.25	6.63
75.0	7.12	6.46	5.44	5.39
90.0	5.25	4.62	4.43	3.64
105.0	3.38	2.32	1.75	0.67
120.0	-0.45	-2.12	-6.59	-16.68
135.0	-4.53	-5.00	-1.32	-0.95
150.0	-0.59	-1.04	0.99	2.00
165.0	3.09	2.23	3.86	3.74
180.0	3.76	3.97	5.57	4.98
195.0	2.43	4.30	4.51	4.35
210.0	0.73	1.59	3.10	3.60
225.0	0.15	1.09	2.91	2.70
240.0	1.68	2.17	2.72	1.57
255.0	3.82	3.78	2.18	1.91
270.0	5.36	4.26	1.56	2.22
285.0	5.82	5.31	2.24	2.52
300.0	5.74	6.00	2.83	2.79
315.0	5.13	5.20	3.76	3.95
330.0	5.08	4.52	4.53	4.87
345.0	5.96	4.75	5.28	5.62
360.0	5.77	6.00	5.92	6.27



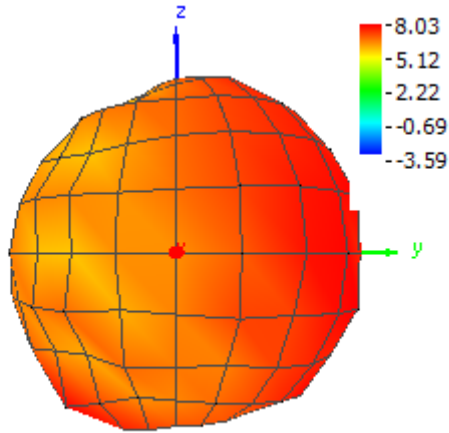
RP\_2402.000\_ver

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-2.14	-4.02	-10.65	-11.63	-12.48	-8.99	-4.46	-3.43
15.0	---	-0.47	-10.45	-14.26	-6.61	-7.08	-4.94	-4.16
30.0	---	1.46	-10.26	-10.69	-7.83	-3.43	-7.98	-4.45
45.0	---	2.80	-2.37	-6.16	-8.98	-4.88	-6.22	-4.62
60.0	---	3.81	0.27	-1.87	-8.09	-5.57	-6.50	-4.31
75.0	---	4.67	3.23	0.85	-6.17	-6.56	-8.00	-2.54
90.0	---	5.39	4.98	2.76	-3.60	-6.41	-7.38	-1.97
105.0	---	6.01	5.47	4.23	-1.18	-4.76	-6.86	-1.77
120.0	---	6.55	5.91	4.94	0.73	-2.08	-6.62	-2.29
135.0	---	5.52	5.01	4.88	1.77	-0.84	-5.37	-4.40
150.0	---	4.18	3.88	4.03	1.82	-0.99	-3.81	-7.88
165.0	---	2.22	2.35	1.98	0.66	-1.55	-3.70	-9.00
180.0	---	-1.42	-0.04	-0.09	-1.95	-2.66	-4.57	-4.74
195.0	---	0.84	0.52	-1.46	-3.08	-4.88	-4.30	-1.83
210.0	---	2.32	1.01	-0.46	-3.39	-7.73	-3.86	-0.89
225.0	---	3.43	1.58	0.17	-4.00	-10.48	-3.59	-0.99
240.0	---	4.31	2.09	-0.08	-5.89	-13.09	-4.33	-1.33
255.0	---	4.15	2.16	-1.44	-10.86	-17.41	-4.81	-1.80
270.0	---	3.99	2.23	-2.37	-14.91	-16.66	-4.78	-2.31
285.0	---	3.83	1.53	-3.45	-14.54	-11.62	-5.47	-2.61
300.0	---	3.65	0.69	-4.64	-11.74	-9.86	-5.88	-2.38
315.0	---	2.64	-0.78	-5.56	-11.60	-11.13	-5.56	-1.93
330.0	---	1.33	-3.03	-7.14	-13.72	-11.44	-5.37	-0.81
345.0	---	-0.57	-5.34	-9.20	-16.44	-10.42	-4.11	-2.05
360.0	---	-4.02	-10.65	-11.63	-12.48	-8.99	-4.46	-3.43

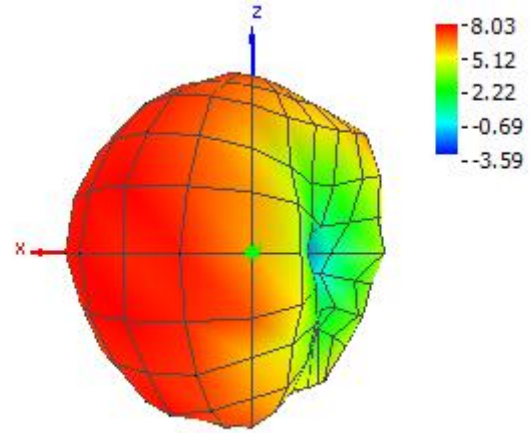
(continuation of the "RP\_2402.000\_ver" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-0.75	-3.15	0.63	-3.60
15.0	-2.54	-5.69	-1.83	-2.74
30.0	-4.64	-7.45	-8.09	-2.02
45.0	-6.36	-6.37	-3.66	-1.40
60.0	-6.38	-2.76	-1.52	-0.86
75.0	-4.85	-0.34	1.88	0.49
90.0	-3.23	1.51	3.76	1.51
105.0	-0.90	3.07	4.21	2.34
120.0	0.59	2.84	4.62	3.03
135.0	0.33	1.56	3.86	2.17
150.0	-2.04	-1.62	2.93	1.10
165.0	-9.17	-5.85	0.06	-0.34
180.0	-7.77	-5.07	-12.06	-2.49
195.0	-2.44	-1.06	-0.21	-0.84
210.0	0.66	2.54	2.66	0.35
225.0	1.90	3.50	3.04	1.29
240.0	2.07	3.55	3.40	2.06
255.0	1.55	2.76	2.80	2.11
270.0	0.68	0.73	2.11	2.17
285.0	0.33	0.48	1.47	2.23
300.0	0.55	2.19	0.73	2.28
315.0	0.03	4.82	3.21	1.39
330.0	-0.75	3.74	4.79	0.27
345.0	-0.75	1.34	3.19	-1.25
360.0	-0.75	-3.15	0.63	-3.60

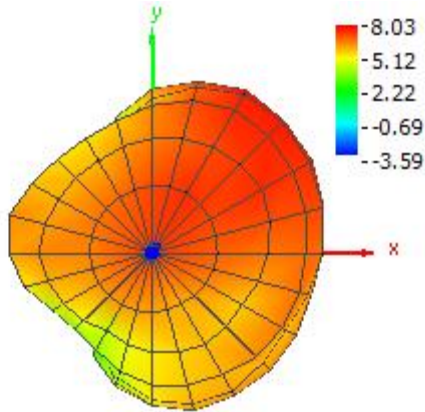
Theta = 90, Phi = 0



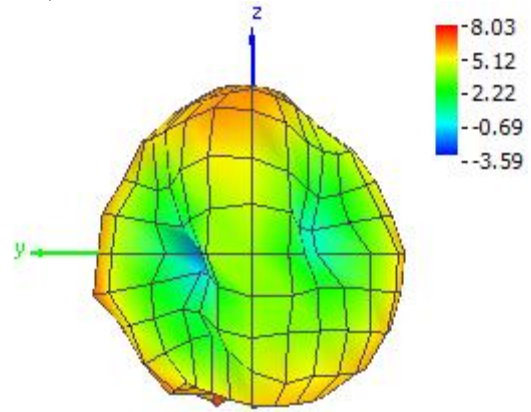
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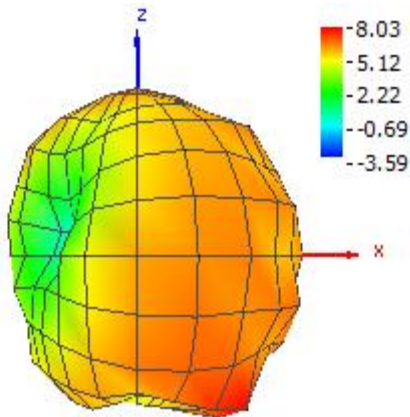
Theta = 0, Phi = 0



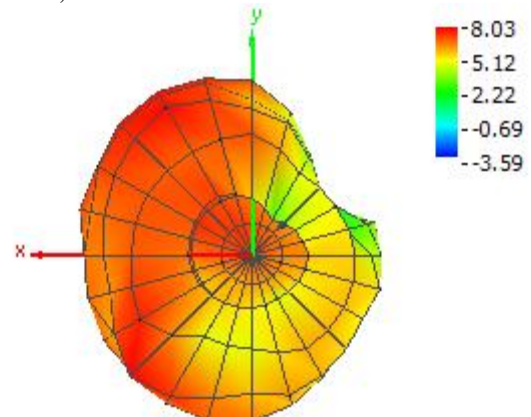
Theta = 90, Phi = 180



Theta = 90, Phi = 270



Theta = 180, Phi = 0





### 1.6.4 Partial report no. 141/K34/D/2023/1d for measurement of RF Output Power radiated power measurement of Bluetooth Low Energy Transmitter, Sample #1, 2440, Set Power 0

#### Active OTA - Total Radiated Power Test

##### Common Information

Test Description:	OTA Measurement, pattern of radiation power
Operating Conditions:	Normal, 800MHz - 6GHz - FAR Chamber
Operator Name:	Adam Jezak, Piotr Jopek, Robert Borowiec
Comment:	SS: CMW500, GSM, FSW Measurement: Max Peak - Zero Span

##### EUT Information

EUT Name:	Antena BLE
Manufacturer:	Vector
Serial Number:	SN: 1140397
Hardware Rev:	-
Software Rev:	-
Comment:	Ustawiona moc na urządzeniu 0, płaszczyzna XY, bateria w stronę masztu., Signal Number 8, 2440MHz

##### Protocol

##### OTA Auto Test Template: Active OTA\_Max-Peak

OTA Test Method:	Radiated Power Mobile Phone
Hardware Setup:	OTA Measurements\Active Antenna OTA
Mobile Phone Network:	<user defined>

TX: Zero-Span Max Peak, Resolution Bandwidth = 1 MHz	
Polarization = Hor,Ver; Azimuth = 0 - 360 deg; Elevation = 0 - (15) - 165 deg	
Radio Channel:	850 (128-251),1900 (512-810)

No measurements defined

##### Hardware Setup: OTA Measurements\Active Antenna OTA

Radiated Power Mobile Phone:	
Analyzer:	FSW43 for OTA @ VISA (ADR TCPIP0::192.168.0.50::inst0::INSTR), SN 1312.8000K43/103850, FW 5.21
Signal Path:	RadPower Vertical FSW
Signal Path2:	RadPower Horizontal FSW
Antenna:	QH800
Turntable:	Elevation @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Turn Device:	Azimuth @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Comm Tester:	<user defined>

Sensitivity Mobile Phone:	Not available
Antenna Measurement:	Not available



### Test Information

Test Method:	Radiated Power Mobile Phone
Test Condition:	FS: Free Space
Frequency:	2440.000 MHz
Test Time:	Start: 12/8/2023 11:25:35 AM; Stop: 12/8/2023 11:33:01 AM
Cal Data Hor:	49.62 dB (FSW43 to MeasAnt1 hor 2023)
Cal Data Ver:	49.68 dB (FSW43 to MeasAnt1 ver 2023)

### OTA Test Results for Channel 2440.000 MHz, 2440.000 MHz

OTA Evaluation Results:	
Total Radiated Power	-1.38 dBm
Peak EIRP	0.87 dBm
Directivity	2.25 dBi
Peak Gain	0.87 dBi
NHPRP 45°	-3.05 dBm
NHPRP 45° / TRP	-1.66 dB
NHPRP 45° / TRP	68.19 %
NHPRP 30°	-4.63 dBm
NHPRP 30° / TRP	-3.25 dB
NHPRP 30° / TRP	47.34 %
NHPRP 22.5°	-5.80 dBm
NHPRP 22.5° / TRP	-4.42 dB
NHPRP 22.5° / TRP	36.12 %
UHRP	-4.38 dBm
UHRP / TRP	-3.00 dB
UHRP / TRP	50.11 %
LHRP	-4.40 dBm
LHRP / TRP	-3.02 dB
LHRP / TRP	49.89 %
PGRP (0-120°)	-2.66 dBm
PGRP / TRP	-1.28 dB
PGRP / TRP	74.44 %
Front/Back Ratio	2.69
PhiBW	252.6 deg
PhiBW Up	154.6 deg
PhiBW Down	98.0 deg
ThetaBW	223.5 deg
ThetaBW Up	40.9 deg
ThetaBW Down	182.5 deg
Boresight Phi	315 deg
Boresight Theta	135 deg
Maximum Power	0.87 dBm
Minimum Power	-8.81 dBm
Average Power	-1.11 dBm
Max/Min Ratio	9.68 dB
Max/Avg Ratio	1.98 dB
Min/Avg Ratio	-7.70 dB
Worst Single Value	-25.12 dBm
Worst Position	Azi = 0 deg; Elev = 45 deg; Pol = Ver
Best Single Value	0.43 dBm
Best Position	Azi = 45 deg; Elev = 90 deg; Pol = Hor

RP 2440.000\_tot

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.00	-0.06	-0.32	-0.49	-0.56	-0.24	-1.00	-0.28	-0.31
15.00	---	-0.21	-0.17	-0.30	-0.04	-0.26	0.07	0.04
30.00	---	-0.10	0.14	0.04	0.17	0.22	0.50	0.17
45.00	---	0.00	0.24	0.34	0.40	0.50	0.60	0.76
60.00	---	0.11	0.33	0.33	0.31	0.65	0.56	0.72
75.00	---	0.00	0.16	-0.06	-0.30	0.11	0.54	0.54
90.00	---	-0.11	-0.02	-0.63	-0.97	-0.51	-0.70	-0.16
105.00	---	-0.22	-0.25	-1.28	-2.43	-2.11	-2.00	-1.83
120.00	---	-0.33	-0.50	-1.80	-3.65	-4.56	-5.24	-4.36
135.00	---	-0.40	-0.52	-1.82	-3.67	-6.27	-8.81	-8.17
150.00	---	-0.47	-0.54	-1.34	-2.69	-5.42	-6.83	-8.43
165.00	---	-0.54	-0.55	-0.62	-1.82	-3.38	-3.78	-4.91
180.00	---	-0.61	-0.56	-0.79	-2.02	-2.52	-3.06	-3.25
195.00	---	-0.66	-0.89	-1.54	-2.70	-3.73	-3.35	-3.50
210.00	---	-0.71	-1.24	-3.05	-4.38	-6.42	-5.23	-4.51
225.00	---	-0.77	-1.69	-3.69	-5.59	-7.28	-6.29	-4.52
240.00	---	-0.82	-2.19	-3.67	-4.86	-5.60	-3.87	-3.42
255.00	---	-0.84	-1.78	-3.09	-3.10	-3.34	-2.39	-2.00
270.00	---	-0.86	-1.41	-2.08	-1.65	-2.02	-0.98	-1.04
285.00	---	-0.88	-1.15	-1.56	-1.09	-1.23	-0.53	-0.51
300.00	---	-0.90	-0.91	-1.24	-0.99	-0.89	-0.31	-0.60
315.00	---	-0.75	-1.07	-0.86	-1.30	-0.76	-1.02	-0.08
330.00	---	-0.60	-1.23	-0.72	-1.46	-0.75	-0.91	-0.10
345.00	---	-0.46	-0.85	-0.63	-0.98	-1.07	-0.40	-0.77
360.00	---	-0.32	-0.49	-0.56	-0.24	-1.00	-0.28	-0.31

(continuation of the "RP\_2440.000\_tot" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.00	-0.50	-0.71	-0.33	-0.35
15.00	-0.59	-0.44	-0.25	-0.32
30.00	0.03	-0.15	-0.17	-0.30
45.00	0.33	0.20	-0.28	-0.27
60.00	0.48	0.73	-0.38	-0.25
75.00	0.50	0.24	-0.13	-0.99
90.00	-0.93	-0.62	0.10	-1.88
105.00	-1.46	-1.53	-0.92	-3.01
120.00	-2.93	-3.50	-2.26	-4.54
135.00	-5.12	-5.48	-2.41	-3.71
150.00	-6.51	-6.45	-2.57	-3.02
165.00	-5.32	-5.26	-2.56	-2.42
180.00	-4.00	-3.19	-2.55	-1.89
195.00	-3.58	-2.02	-2.12	-2.07
210.00	-3.27	-2.34	-1.73	-2.25
225.00	-2.99	-1.90	-1.64	-2.44
240.00	-2.41	-1.34	-1.56	-2.64
255.00	-1.49	-0.84	-2.02	-2.35
270.00	-0.55	-1.46	-2.54	-2.07
285.00	-0.15	-0.67	-2.21	-1.81
300.00	-0.18	0.42	-1.91	-1.57
315.00	-0.70	0.87	-0.48	-1.23
330.00	-0.82	0.02	0.59	-0.91
345.00	-0.18	-0.76	0.15	-0.62
360.00	-0.50	-0.71	-0.33	-0.35

RP 2440.000 hor

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-0.77	-0.73	-0.58	-0.57	-0.33	-1.27	-0.98	-1.17
15.0	---	-1.03	-0.28	-0.33	-0.26	-0.59	-0.40	-0.61
30.0	---	-1.36	0.00	-0.08	-0.01	-0.13	0.20	-0.33
45.0	---	-1.71	-0.47	0.08	0.23	0.18	0.43	0.31
60.0	---	-2.09	-1.00	-0.20	0.09	0.41	0.30	0.40
75.0	---	-3.22	-2.57	-1.16	-0.67	-0.15	0.41	0.15
90.0	---	-4.73	-5.07	-2.82	-1.59	-0.78	-1.02	-0.58
105.0	---	-7.08	-7.96	-6.08	-4.08	-2.72	-2.38	-2.49
120.0	---	-12.57	-20.57	-10.95	-8.20	-6.71	-6.16	-5.64
135.0	---	-6.86	-8.85	-12.13	-12.34	-12.75	-12.71	-10.80
150.0	---	-4.47	-5.99	-7.19	-8.63	-10.84	-9.85	-10.50
165.0	---	-2.94	-3.81	-3.09	-4.92	-5.99	-4.98	-5.92
180.0	---	-1.81	-2.37	-2.41	-3.75	-4.11	-4.18	-4.31
195.0	---	-2.35	-2.69	-2.91	-4.20	-5.11	-4.77	-5.26
210.0	---	-2.96	-3.03	-5.05	-6.18	-8.04	-7.54	-7.47
225.0	---	-3.67	-4.29	-6.13	-7.41	-8.29	-9.32	-7.49
240.0	---	-4.52	-6.06	-5.72	-5.77	-5.93	-4.84	-5.52
255.0	---	-4.60	-4.67	-4.21	-3.35	-3.45	-2.88	-3.34
270.0	---	-4.67	-3.62	-2.60	-1.70	-2.10	-1.41	-1.91
285.0	---	-4.74	-2.93	-1.90	-1.15	-1.38	-0.91	-1.24
300.0	---	-4.82	-2.34	-1.51	-1.07	-1.14	-0.65	-1.45
315.0	---	-3.39	-2.07	-1.04	-1.39	-0.98	-1.51	-1.00
330.0	---	-2.31	-1.82	-0.81	-1.54	-0.99	-1.47	-1.36
345.0	---	-1.45	-1.16	-0.66	-1.03	-1.32	-1.16	-1.83
360.0	---	-0.73	-0.58	-0.57	-0.33	-1.27	-0.98	-1.17

(continuation of the "RP\_2440.000\_hor" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-1.86	-1.63	-2.39	-1.08
15.0	-1.47	-1.02	-1.33	-1.02
30.0	-0.50	-0.50	-0.48	-0.97
45.0	0.03	-0.05	-0.64	-0.91
60.0	0.28	0.35	-0.81	-0.86
75.0	0.20	-0.43	-1.30	-2.07
90.0	-1.52	-1.89	-1.85	-3.76
105.0	-2.72	-4.00	-4.14	-6.57
120.0	-5.84	-8.23	-9.31	-16.87
135.0	-10.66	-14.01	-8.89	-8.30
150.0	-9.91	-11.53	-8.51	-5.60
165.0	-5.76	-6.31	-4.64	-3.95
180.0	-4.27	-3.74	-2.63	-2.76
195.0	-4.61	-3.03	-3.21	-3.29
210.0	-6.10	-5.59	-3.89	-3.90
225.0	-7.26	-5.73	-4.21	-4.60
240.0	-6.11	-4.75	-4.56	-5.45
255.0	-3.75	-3.48	-5.24	-5.38
270.0	-2.01	-3.32	-6.05	-5.31
285.0	-1.53	-2.20	-5.12	-5.25
300.0	-1.77	-1.40	-4.35	-5.18
315.0	-2.36	-2.39	-3.94	-3.74
330.0	-2.35	-3.25	-3.56	-2.66
345.0	-1.58	-3.04	-2.94	-1.80
360.0	-1.86	-1.63	-2.39	-1.08

RP\_2440.000\_ver

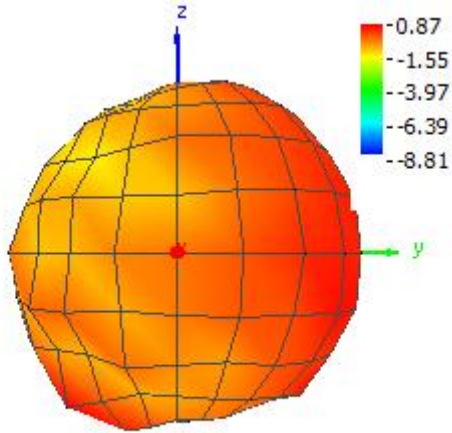
Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-8.31	-10.78	-17.49	-25.12	-17.14	-13.19	-8.54	-7.74
15.0	---	-7.84	-16.11	-21.19	-13.22	-11.61	-9.76	-8.51
30.0	---	-6.10	-15.07	-15.60	-13.67	-10.92	-11.35	-9.49
45.0	---	-4.87	-8.01	-11.97	-13.84	-10.99	-13.64	-9.39
60.0	---	-3.90	-5.45	-9.03	-12.75	-12.10	-11.81	-10.73
75.0	---	-2.81	-3.15	-6.59	-11.21	-12.24	-14.93	-10.04
90.0	---	-1.95	-1.65	-4.66	-9.74	-12.70	-12.26	-10.55
105.0	---	-1.22	-1.06	-3.03	-7.43	-10.93	-12.71	-10.32
120.0	---	-0.60	-0.54	-2.37	-5.53	-8.65	-12.42	-10.28
135.0	---	-1.51	-1.21	-2.24	-4.30	-7.37	-11.09	-11.59
150.0	---	-2.67	-2.00	-2.65	-3.97	-6.89	-9.82	-12.66
165.0	---	-4.25	-3.32	-4.25	-4.74	-6.84	-9.97	-11.74
180.0	---	-6.77	-5.24	-5.86	-6.83	-7.64	-9.49	-9.88
195.0	---	-5.58	-5.58	-7.20	-8.05	-9.37	-8.89	-8.29
210.0	---	-4.65	-5.95	-7.37	-9.08	-11.49	-9.08	-7.58
225.0	---	-3.89	-5.16	-7.35	-10.25	-14.12	-9.28	-7.57
240.0	---	-3.24	-4.49	-7.92	-12.09	-17.00	-10.83	-7.58
255.0	---	-3.22	-4.92	-9.52	-15.66	-19.63	-12.11	-7.76
270.0	---	-3.20	-5.40	-11.54	-21.30	-19.43	-11.24	-8.45
285.0	---	-3.18	-5.89	-12.85	-19.42	-15.85	-11.32	-8.61
300.0	---	-3.16	-6.45	-13.50	-18.28	-13.31	-11.56	-8.10
315.0	---	-4.17	-7.93	-14.97	-18.03	-13.78	-10.71	-7.23
330.0	---	-5.48	-10.19	-17.57	-18.88	-13.54	-10.07	-6.12
345.0	---	-7.37	-12.46	-21.44	-19.98	-13.67	-8.37	-7.38
360.0	---	-10.78	-17.49	-25.12	-17.14	-13.19	-8.54	-7.74

(continuation of the "RP\_2440.000\_ver" table from column 9 ...)

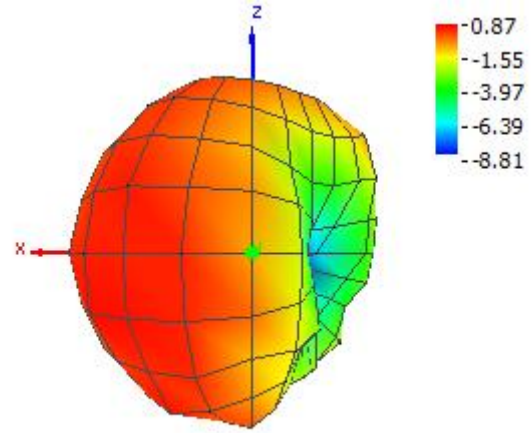
Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-6.18	-7.91	-4.57	-8.47
15.0	-7.93	-9.50	-6.83	-8.61
30.0	-9.31	-11.24	-11.84	-8.76
45.0	-11.43	-12.31	-11.21	-8.92
60.0	-12.95	-10.06	-10.66	-9.08
75.0	-11.15	-8.16	-6.42	-7.56
90.0	-9.88	-6.56	-4.31	-6.43
105.0	-7.45	-5.16	-3.73	-5.54
120.0	-6.04	-5.28	-3.21	-4.80
135.0	-6.55	-6.13	-3.52	-5.57
150.0	-9.16	-8.07	-3.84	-6.50
165.0	-15.50	-11.93	-6.75	-7.70
180.0	-16.17	-12.40	-20.08	-9.35
195.0	-10.32	-8.86	-8.66	-8.19
210.0	-6.48	-5.12	-5.81	-7.27
225.0	-5.02	-4.22	-5.15	-6.52
240.0	-4.83	-3.98	-4.58	-5.87
255.0	-5.40	-4.26	-4.83	-5.34
270.0	-6.01	-6.05	-5.10	-4.86
285.0	-5.79	-5.95	-5.33	-4.43
300.0	-5.34	-4.25	-5.57	-4.04
315.0	-5.69	-1.91	-3.09	-4.80
330.0	-6.10	-2.75	-1.52	-5.71
345.0	-5.77	-4.66	-2.78	-6.88
360.0	-6.18	-7.91	-4.57	-8.47



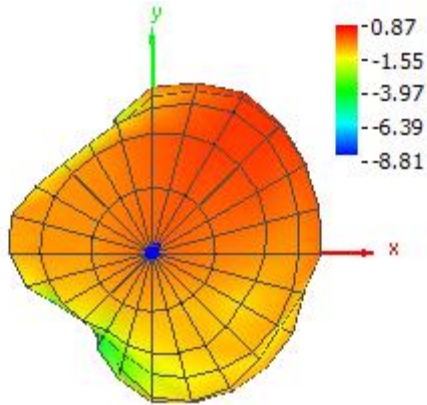
Theta = 90, Phi = 0



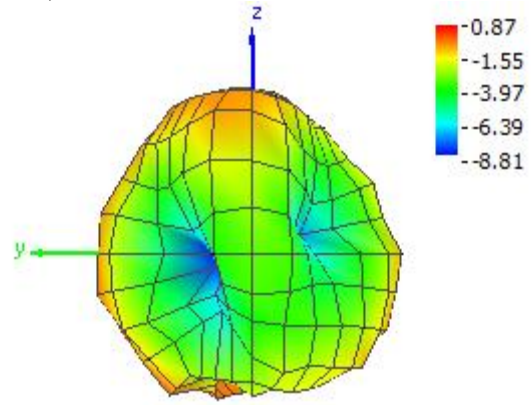
Theta = 90, Phi = 90



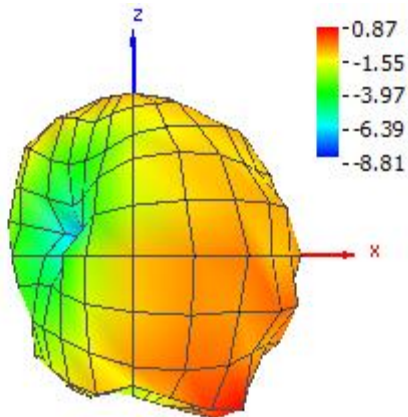
Theta = 0, Phi = 0



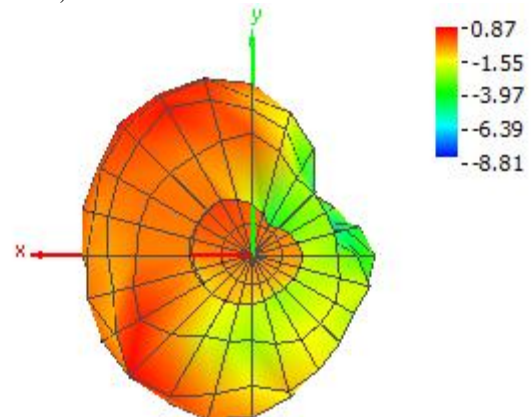
Theta = 90, Phi = 180



Theta = 90, Phi = 270



Theta = 180, Phi = 0





**1.6.5 Partial report no. 141/K34/D/2023/1e for measurement of RF Output Power radiated power measurement of Bluetooth Low Energy Transmitter, Sample #2, 2440, Set Power 0**

**Active OTA - Total Radiated Power Test**

**Common Information**

Test Description:	OTA Measurement, pattern of radiation power
Operating Conditions:	Normal, 800MHz - 6GHz - FAR Chamber
Operator Name:	Adam Jezak, Piotr Jopek, Robert Borowiec
Comment:	SS: CMW500, GSM, FSW Measurement: Max Peak - Zero Span

**EUT Information**

EUT Name:	Antena BLE
Manufacturer:	Vector
Serial Number:	SN: 1140398
Hardware Rev:	-
Software Rev:	-
Comment:	Ustawiona moc na urządzeniu 0, płaszczyzna XY, bateria w stronę masztu, 2440MHz, signal number 8

**Protocol**

**OTA Auto Test Template: Active OTA\_Max-Peak**

OTA Test Method:	Radiated Power Mobile Phone
Hardware Setup:	OTA Measurements\Active Antenna OTA
Mobile Phone Network:	<user defined>

TX: Zero-Span Max Peak, Resolution Bandwidth = 1 MHz	
Polarization = Hor,Ver; Azimuth = 0 - 360 deg; Elevation = 0 - (15) - 165 deg	
Radio Channel:	850 (128-251),1900 (512-810)

No measurements defined

**Hardware Setup: OTA Measurements\Active Antenna OTA**

Radiated Power Mobile Phone:	
Analyzer:	FSW43 for OTA @ VISA (ADR TCP/IP0::192.168.0.50::inst0::INSTR), SN 1312.8000K43/103850, FW 5.21
Signal Path:	RadPower Vertical FSW
Signal Path2:	RadPower Horizontal FSW
Antenna:	QH800
Turntable:	Elevation @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Turn Device:	Azimuth @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Comm Tester:	<user defined>

Sensitivity Mobile Phone:	Not available
Antenna Measurement:	Not available
Conducted MIMO:	Not available



### Test Information

Test Method:	Radiated Power Mobile Phone
Test Condition:	FS: Free Space
Frequency:	2440.000 MHz
Test Time:	Start: 12/8/2023 12:07:00 PM; Stop: 12/8/2023 12:14:25 PM
Cal Data Hor:	49.62 dB (FSW43 to MeasAnt1 hor 2023)
Cal Data Ver:	49.68 dB (FSW43 to MeasAnt1 ver 2023)

### OTA Test Results for Channel 2440.000 MHz, 2440.000 MHz

OTA Evaluation Results:	
Total Radiated Power	-1.90 dBm
Peak EIRP	0.47 dBm
Directivity	2.37 dBi
Peak Gain	0.47 dBi
NHPRP 45°	-3.54 dBm
NHPRP 45° / TRP	-1.64 dB
NHPRP 45° / TRP	68.50 %
NHPRP 30°	-5.12 dBm
NHPRP 30° / TRP	-3.22 dB
NHPRP 30° / TRP	47.64 %
NHPRP 22.5°	-6.29 dBm
NHPRP 22.5° / TRP	-4.39 dB
NHPRP 22.5° / TRP	36.40 %
UHRP	-4.88 dBm
UHRP / TRP	-2.98 dB
UHRP / TRP	50.32 %
LHRP	-4.94 dBm
LHRP / TRP	-3.04 dB
LHRP / TRP	49.68 %
PGRP (0-120°)	-3.17 dBm
PGRP / TRP	-1.27 dB
PGRP / TRP	74.61 %
Front/Back Ratio	8.31
PhiBW	213.1 deg
PhiBW Up	60.5 deg
PhiBW Down	152.5 deg
ThetaBW	218.6 deg
ThetaBW Up	82.6 deg
ThetaBW Down	136.0 deg
Boresight Phi	45 deg
Boresight Theta	105 deg
Maximum Power	0.47 dBm
Minimum Power	-10.42 dBm
Average Power	-1.66 dBm
Max/Min Ratio	10.88 dB
Max/Avg Ratio	2.13 dB
Min/Avg Ratio	-8.76 dB
Worst Single Value	-25.38 dBm
Worst Position	Azi = 120 deg; Elev = 30 deg; Pol = Hor
Best Single Value	0.30 dBm
Best Position	Azi = 45 deg; Elev = 90 deg; Pol = Hor

RP 2440.000\_tot

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.00	-0.71	-0.91	-1.15	-1.19	-0.82	-1.67	-0.98	-1.10
15.00	---	-0.78	-0.78	-0.85	-0.59	-0.80	-0.39	-0.43
30.00	---	-0.65	-0.44	-0.38	-0.26	-0.18	0.17	-0.17
45.00	---	-0.53	-0.33	0.04	0.09	0.28	0.38	0.47
60.00	---	-0.42	-0.22	0.00	0.07	0.37	0.39	0.35
75.00	---	-0.50	-0.37	-0.44	-0.55	-0.21	0.23	0.21
90.00	---	-0.59	-0.52	-1.05	-1.33	-0.94	-1.04	-0.68
105.00	---	-0.68	-0.76	-1.73	-2.98	-2.80	-2.64	-2.43
120.00	---	-0.77	-1.02	-2.25	-4.39	-5.50	-6.61	-5.23
135.00	---	-0.87	-1.13	-2.32	-4.28	-6.80	-10.42	-8.83
150.00	---	-0.98	-1.24	-1.95	-3.09	-5.47	-6.88	-8.09
165.00	---	-1.09	-1.39	-1.35	-2.23	-3.76	-3.71	-5.11
180.00	---	-1.21	-1.54	-1.61	-2.88	-3.27	-3.76	-3.81
195.00	---	-1.26	-1.80	-2.42	-3.81	-4.82	-4.69	-4.27
210.00	---	-1.31	-2.07	-3.92	-5.41	-7.91	-6.84	-5.48
225.00	---	-1.36	-2.41	-4.25	-6.02	-7.84	-7.14	-5.41
240.00	---	-1.41	-2.78	-3.87	-4.78	-5.34	-4.05	-3.93
255.00	---	-1.44	-2.34	-3.03	-3.03	-3.17	-2.49	-2.25
270.00	---	-1.47	-1.94	-2.17	-1.80	-2.05	-1.17	-1.33
285.00	---	-1.50	-1.73	-1.84	-1.46	-1.43	-0.97	-0.94
300.00	---	-1.53	-1.53	-1.71	-1.46	-1.37	-0.83	-1.26
315.00	---	-1.36	-1.73	-1.48	-1.88	-1.43	-1.62	-0.91
330.00	---	-1.21	-1.93	-1.36	-2.12	-1.39	-1.73	-0.79
345.00	---	-1.06	-1.52	-1.28	-1.63	-1.68	-1.16	-1.54
360.00	---	-0.91	-1.15	-1.19	-0.82	-1.67	-0.98	-1.10

(continuation of the "RP\_2440.000\_tot" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.00	-1.20	-1.30	-0.95	-0.99
15.00	-1.15	-0.93	-0.82	-0.91
30.00	-0.38	-0.55	-0.70	-0.82
45.00	0.04	-0.15	-0.71	-0.74
60.00	0.22	0.27	-0.72	-0.66
75.00	0.13	-0.13	-0.67	-1.35
90.00	-1.43	-0.95	-0.63	-2.16
105.00	-2.30	-2.18	-1.54	-3.17
120.00	-4.08	-4.17	-2.69	-4.48
135.00	-6.18	-5.99	-2.73	-3.79
150.00	-6.73	-6.59	-2.76	-3.19
165.00	-5.21	-5.49	-2.72	-2.66
180.00	-4.20	-3.59	-2.68	-2.19
195.00	-4.38	-2.49	-2.30	-2.48
210.00	-4.14	-2.78	-1.95	-2.79
225.00	-3.66	-2.31	-1.99	-3.12
240.00	-2.91	-1.78	-2.04	-3.48
255.00	-1.97	-1.35	-2.60	-3.22
270.00	-1.06	-2.01	-3.26	-2.98
285.00	-0.81	-1.34	-3.06	-2.74
300.00	-0.83	-0.33	-2.86	-2.52
315.00	-1.46	0.11	-1.44	-2.09
330.00	-1.73	-0.81	-0.37	-1.69
345.00	-1.03	-1.56	-0.65	-1.33
360.00	-1.20	-1.30	-0.95	-0.99

RP 2440.000 hor

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-1.23	-1.20	-1.20	-1.22	-0.90	-1.87	-1.51	-1.76
15.0	---	-1.58	-0.90	-0.89	-0.77	-1.01	-0.73	-0.90
30.0	---	-1.99	-0.61	-0.51	-0.39	-0.41	0.01	-0.48
45.0	---	-2.45	-1.12	-0.25	-0.04	0.08	0.30	0.19
60.0	---	-2.96	-1.70	-0.59	-0.15	0.24	0.23	0.18
75.0	---	-4.03	-3.41	-1.65	-0.98	-0.36	0.15	-0.03
90.0	---	-5.46	-6.25	-3.50	-2.08	-1.11	-1.28	-0.95
105.0	---	-7.60	-9.21	-7.26	-4.96	-3.31	-2.93	-2.95
120.0	---	-12.01	-25.38	-12.19	-9.57	-7.61	-7.49	-6.33
135.0	---	-6.97	-8.44	-11.63	-12.21	-12.37	-14.04	-10.97
150.0	---	-4.70	-5.47	-6.84	-7.70	-9.23	-8.97	-9.16
165.0	---	-3.21	-4.04	-3.36	-4.59	-5.70	-4.63	-5.71
180.0	---	-2.11	-2.97	-2.92	-4.16	-4.44	-4.59	-4.69
195.0	---	-2.78	-3.56	-3.68	-5.16	-5.84	-5.90	-6.05
210.0	---	-3.58	-4.24	-6.29	-7.35	-9.22	-8.94	-8.65
225.0	---	-4.56	-5.42	-7.12	-7.94	-8.56	-9.29	-8.05
240.0	---	-5.83	-7.04	-6.05	-5.66	-5.57	-4.68	-5.45
255.0	---	-5.65	-5.31	-4.13	-3.26	-3.22	-2.80	-3.21
270.0	---	-5.47	-4.08	-2.72	-1.84	-2.09	-1.45	-1.96
285.0	---	-5.30	-3.39	-2.19	-1.51	-1.54	-1.23	-1.49
300.0	---	-5.14	-2.80	-1.97	-1.53	-1.55	-1.10	-1.93
315.0	---	-3.77	-2.59	-1.64	-1.94	-1.60	-1.99	-1.68
330.0	---	-2.74	-2.40	-1.45	-2.18	-1.59	-2.18	-1.81
345.0	---	-1.90	-1.76	-1.31	-1.68	-1.92	-1.77	-2.42
360.0	---	-1.20	-1.20	-1.22	-0.90	-1.87	-1.51	-1.76

(continuation of the "RP\_2440.000\_hor" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-2.20	-2.00	-2.66	-1.51
15.0	-1.76	-1.30	-1.66	-1.43
30.0	-0.72	-0.75	-0.85	-1.36
45.0	-0.12	-0.30	-0.96	-1.28
60.0	0.11	0.02	-1.07	-1.21
75.0	-0.06	-0.69	-1.85	-2.43
90.0	-1.88	-2.13	-2.80	-4.14
105.0	-3.49	-4.79	-5.20	-7.00
120.0	-7.16	-8.89	-10.98	-18.52
135.0	-11.89	-12.64	-9.00	-8.48
150.0	-9.31	-9.89	-7.65	-5.69
165.0	-5.58	-6.24	-4.52	-4.01
180.0	-4.57	-4.17	-2.72	-2.79
195.0	-5.59	-3.70	-3.54	-3.56
210.0	-7.16	-6.61	-4.56	-4.49
225.0	-7.83	-6.54	-5.02	-5.67
240.0	-6.22	-5.30	-5.53	-7.29
255.0	-3.89	-3.88	-6.12	-6.90
270.0	-2.28	-3.69	-6.79	-6.54
285.0	-2.00	-2.70	-5.97	-6.21
300.0	-2.22	-1.99	-5.28	-5.90
315.0	-2.92	-2.80	-4.60	-4.32
330.0	-3.02	-3.71	-4.01	-3.17
345.0	-2.13	-3.51	-3.28	-2.26
360.0	-2.20	-2.00	-2.66	-1.51

RP\_2440.000\_ver

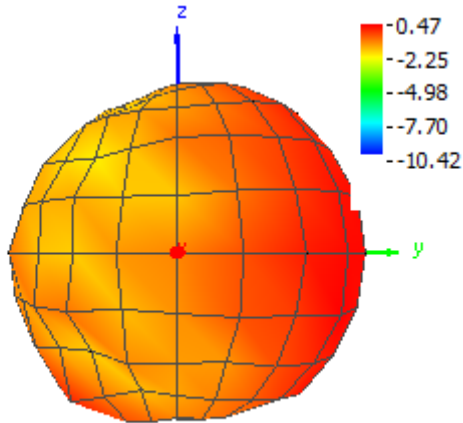
Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-10.14	-12.77	-21.04	-23.14	-18.12	-15.08	-10.33	-9.57
15.0	---	-8.53	-16.66	-21.50	-14.47	-14.08	-11.51	-10.36
30.0	---	-6.42	-14.52	-15.67	-15.44	-13.05	-14.25	-11.77
45.0	---	-5.01	-8.10	-11.89	-15.17	-13.06	-16.89	-11.70
60.0	---	-3.95	-5.61	-9.00	-12.95	-15.17	-14.01	-13.82
75.0	---	-3.05	-3.35	-6.58	-10.80	-14.85	-17.00	-12.54
90.0	---	-2.30	-1.87	-4.70	-9.34	-15.20	-13.71	-12.80
105.0	---	-1.66	-1.43	-3.15	-7.34	-12.38	-14.60	-11.92
120.0	---	-1.11	-1.04	-2.71	-5.96	-9.66	-14.01	-11.74
135.0	---	-2.10	-2.02	-2.86	-5.04	-8.22	-12.89	-12.93
150.0	---	-3.39	-3.30	-3.65	-4.93	-7.83	-11.07	-14.70
165.0	---	-5.23	-4.79	-5.67	-6.00	-8.20	-10.91	-14.01
180.0	---	-8.49	-7.07	-7.44	-8.81	-9.51	-11.37	-11.14
195.0	---	-6.55	-6.58	-8.41	-9.54	-11.62	-10.86	-9.00
210.0	---	-5.21	-6.13	-7.69	-9.84	-13.75	-11.01	-8.34
225.0	---	-4.19	-5.43	-7.41	-10.50	-16.01	-11.21	-8.82
240.0	---	-3.36	-4.82	-7.90	-12.16	-18.23	-12.75	-9.21
255.0	---	-3.52	-5.39	-9.53	-15.91	-22.75	-14.11	-9.30
270.0	---	-3.68	-6.04	-11.47	-22.43	-22.75	-13.16	-10.02
285.0	---	-3.84	-6.71	-13.03	-20.70	-17.65	-13.39	-10.22
300.0	---	-4.01	-7.50	-14.16	-19.67	-15.30	-13.04	-9.72
315.0	---	-5.08	-9.14	-15.69	-19.89	-15.60	-12.48	-8.78
330.0	---	-6.48	-11.81	-18.58	-20.86	-14.88	-11.83	-7.59
345.0	---	-8.58	-14.33	-22.49	-20.81	-14.29	-10.03	-8.90
360.0	---	-12.77	-21.04	-23.14	-18.12	-15.08	-10.33	-9.57

(continuation of the "RP\_2440.000\_ver" table from column 9 ...)

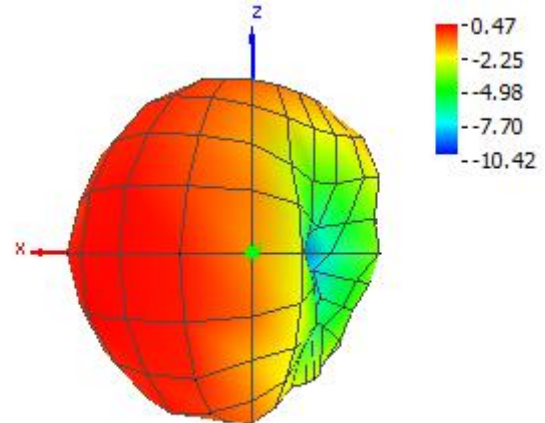
Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-8.09	-9.58	-5.84	-10.53
15.0	-9.97	-11.77	-8.37	-10.37
30.0	-11.68	-14.01	-15.21	-10.21
45.0	-14.19	-14.92	-13.19	-10.06
60.0	-15.83	-12.25	-11.81	-9.91
75.0	-13.44	-9.29	-6.92	-7.90
90.0	-11.46	-7.19	-4.68	-6.53
105.0	-8.49	-5.63	-3.99	-5.49
120.0	-7.01	-5.96	-3.39	-4.66
135.0	-7.54	-7.04	-3.89	-5.59
150.0	-10.21	-9.33	-4.46	-6.77
165.0	-16.15	-13.48	-7.42	-8.41
180.0	-15.13	-12.60	-23.31	-11.07
195.0	-10.53	-8.64	-8.34	-9.06
210.0	-7.14	-5.10	-5.40	-7.69
225.0	-5.75	-4.37	-4.98	-6.66
240.0	-5.64	-4.34	-4.61	-5.82
255.0	-6.45	-4.89	-5.17	-5.66
270.0	-7.16	-6.96	-5.80	-5.50
285.0	-6.99	-7.03	-6.17	-5.34
300.0	-6.46	-5.32	-6.56	-5.20
315.0	-6.92	-2.99	-4.31	-6.04
330.0	-7.64	-3.93	-2.83	-7.09
345.0	-7.54	-5.99	-4.08	-8.48
360.0	-8.09	-9.58	-5.84	-10.53



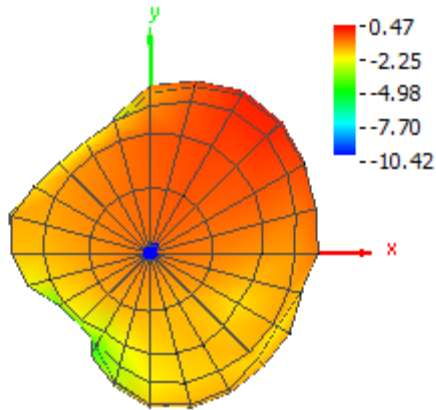
Theta = 90, Phi = 0



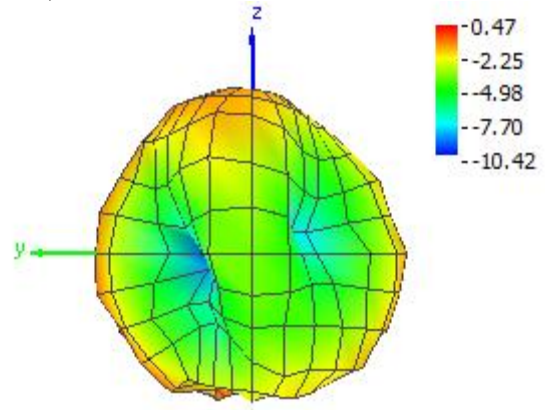
Theta = 90, Phi = 90



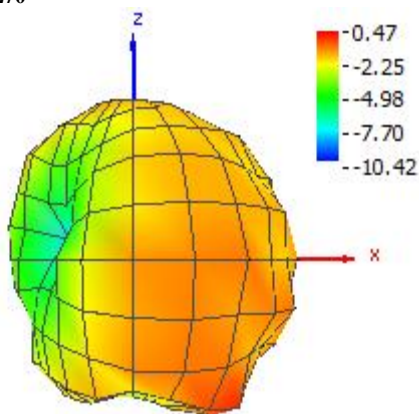
Theta = 0, Phi = 0



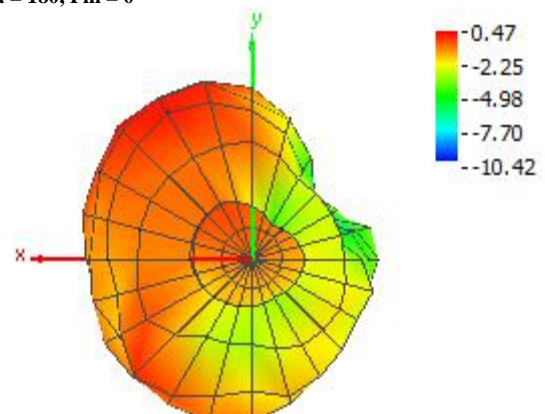
Theta = 90, Phi = 180



Theta = 90, Phi = 270



Theta = 180, Phi = 0







### 1.6.6 Partial report no. 141/K34/D/2023/1f for measurement of RF Output Power radiated power measurement of Bluetooth Low Energy Transmitter, Sample #1, 2480, Set Power 0

#### Active OTA - Total Radiated Power Test

##### Common Information

Test Description:	OTA Measurement, pattern of radiation power
Operating Conditions:	Normal, 800MHz - 6GHz - FAR Chamber
Operator Name:	Adam Jezak, Piotr Jopek, Robert Borowiec
Comment:	SS: CMW500, GSM, FSW Measurement: Max Peak - Zero Span

##### EUT Information

EUT Name:	Antena BLE
Manufacturer:	Vector
Serial Number:	SN: 1140397
Hardware Rev:	-
Software Rev:	-
Comment:	Ustawiona moc na urządzeniu 0, płaszczyzna XY, bateria w stronę masztu, 2480MHz, signal number 8

##### Protocol

##### OTA Auto Test Template: Active OTA\_Max-Peak

OTA Test Method:	Radiated Power Mobile Phone
Hardware Setup:	OTA Measurements\Active Antenna OTA
Mobile Phone Network:	<user defined>

TX: Zero-Span Max Peak, Resolution Bandwidth = 1 MHz	
Polarization = Hor,Ver; Azimuth = 0 - 360 deg; Elevation = 0 - (15) - 165 deg	
Radio Channel:	850 (128-251),1900 (512-810)

No measurements defined

##### Hardware Setup: OTA Measurements\Active Antenna OTA

Radiated Power Mobile Phone:	
Analyzer:	FSW43 for OTA @ VISA (ADR TCPIP0::192.168.0.50::inst0::INSTR), SN 1312.8000K43/103850, FW 5.21
Signal Path:	RadPower Vertical FSW
Signal Path2:	RadPower Horizontal FSW
Antenna:	QH800
Turntable:	Elevation @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Turn Device:	Azimuth @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Comm Tester:	<user defined>

Sensitivity Mobile Phone:	Not available
Antenna Measurement:	Not available



### Test Information

Test Method:	Radiated Power Mobile Phone
Test Condition:	FS: Free Space
Frequency:	2480.000 MHz
Test Time:	Start: 12/8/2023 11:38:50 AM; Stop: 12/8/2023 11:46:17 AM
Cal Data Hor:	49.92 dB (FSW43 to MeasAnt1 hor 2023)
Cal Data Ver:	50.02 dB (FSW43 to MeasAnt1 ver 2023)

### OTA Test Results for Channel 2480.000 MHz, 2480.000 MHz

OTA Evaluation Results:	
Total Radiated Power	-2.18 dBm
Peak EIRP	0.27 dBm
Directivity	2.45 dBi
Peak Gain	0.27 dBi
NHPRP 45°	-3.84 dBm
NHPRP 45° / TRP	-1.66 dB
NHPRP 45° / TRP	68.16 %
NHPRP 30°	-5.43 dBm
NHPRP 30° / TRP	-3.25 dB
NHPRP 30° / TRP	47.34 %
NHPRP 22.5°	-6.61 dBm
NHPRP 22.5° / TRP	-4.43 dB
NHPRP 22.5° / TRP	36.08 %
UHRP	-5.18 dBm
UHRP / TRP	-3.01 dB
UHRP / TRP	50.05 %
LHRP	-5.19 dBm
LHRP / TRP	-3.01 dB
LHRP / TRP	49.95 %
PGRP (0-120°)	-3.46 dBm
PGRP / TRP	-1.28 dB
PGRP / TRP	74.41 %
Front/Back Ratio	8.01
PhiBW	214.5 deg
PhiBW Up	63.2 deg
PhiBW Down	151.3 deg
ThetaBW	215.8 deg
ThetaBW Up	81.2 deg
ThetaBW Down	134.6 deg
Boresight Phi	45 deg
Boresight Theta	105 deg
Maximum Power	0.27 dBm
Minimum Power	-10.08 dBm
Average Power	-1.89 dBm
Max/Min Ratio	10.35 dB
Max/Avg Ratio	2.16 dB
Min/Avg Ratio	-8.19 dB
Worst Single Value	-25.65 dBm
Worst Position	Azi = 300 deg; Elev = 60 deg; Pol = Ver
Best Single Value	-0.22 dBm
Best Position	Azi = 45 deg; Elev = 105 deg; Pol = Hor

RP 2480.000\_tot

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.00	-0.73	-0.90	-1.14	-1.52	-0.94	-1.91	-1.44	-1.06
15.00	---	-0.84	-0.78	-1.21	-0.87	-0.91	-1.03	-0.63
30.00	---	-0.79	-0.44	-0.76	-0.47	-0.44	-0.59	-0.29
45.00	---	-0.73	-0.43	-0.37	-0.25	-0.07	-0.39	0.27
60.00	---	-0.67	-0.41	-0.53	-0.39	-0.40	-0.09	-0.09
75.00	---	-0.67	-0.65	-0.90	-0.88	-0.70	-0.61	0.03
90.00	---	-0.67	-0.92	-1.44	-1.67	-1.47	-1.29	-0.88
105.00	---	-0.67	-1.02	-2.22	-3.33	-3.24	-3.00	-2.21
120.00	---	-0.67	-1.12	-2.76	-4.76	-5.70	-6.46	-4.64
135.00	---	-0.80	-1.19	-2.83	-4.67	-6.95	-10.08	-8.64
150.00	---	-0.93	-1.26	-2.42	-3.36	-5.33	-7.93	-8.91
165.00	---	-1.07	-1.39	-1.71	-2.28	-3.49	-4.68	-5.59
180.00	---	-1.21	-1.53	-1.76	-2.75	-2.94	-4.20	-4.05
195.00	---	-1.39	-1.90	-2.36	-3.87	-4.18	-4.60	-4.25
210.00	---	-1.58	-2.30	-3.83	-5.63	-6.89	-6.77	-5.18
225.00	---	-1.77	-2.75	-4.25	-6.55	-7.74	-7.55	-5.30
240.00	---	-1.98	-3.25	-4.00	-5.60	-5.76	-4.68	-4.16
255.00	---	-1.94	-3.02	-3.29	-3.89	-3.62	-3.08	-2.59
270.00	---	-1.91	-2.80	-2.56	-2.40	-2.36	-1.97	-1.50
285.00	---	-1.88	-2.47	-2.13	-1.86	-1.89	-1.53	-1.11
300.00	---	-1.85	-2.16	-1.84	-1.93	-1.65	-1.46	-1.25
315.00	---	-1.59	-2.10	-1.56	-2.29	-1.48	-2.22	-0.80
330.00	---	-1.35	-2.04	-1.49	-2.28	-1.61	-2.09	-0.95
345.00	---	-1.12	-1.57	-1.49	-1.60	-2.04	-1.62	-1.51
360.00	---	-0.90	-1.14	-1.52	-0.94	-1.91	-1.44	-1.06

(continuation of the "RP\_2480.000\_tot" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.00	-1.58	-1.67	-1.28	-0.94
15.00	-1.37	-1.37	-1.28	-0.85
30.00	-0.78	-0.90	-1.28	-0.76
45.00	-0.49	-0.35	-1.14	-0.68
60.00	-0.30	0.09	-1.02	-0.59
75.00	-0.22	-0.04	-0.84	-1.26
90.00	-1.41	-0.66	-0.68	-2.06
105.00	-2.19	-2.12	-1.46	-3.03
120.00	-3.84	-3.92	-2.41	-4.29
135.00	-5.94	-5.64	-2.84	-3.87
150.00	-7.18	-6.61	-3.32	-3.49
165.00	-6.41	-6.00	-3.42	-3.13
180.00	-5.19	-4.22	-3.52	-2.81
195.00	-4.87	-3.13	-2.97	-3.05
210.00	-4.52	-3.43	-2.48	-3.30
225.00	-3.98	-2.96	-2.54	-3.58
240.00	-3.19	-2.31	-2.60	-3.87
255.00	-2.27	-1.68	-3.05	-3.55
270.00	-1.46	-2.42	-3.56	-3.26
285.00	-1.01	-1.65	-3.15	-2.98
300.00	-1.04	-0.53	-2.78	-2.72
315.00	-1.61	-0.02	-1.43	-2.21
330.00	-1.82	-0.81	-0.39	-1.74
345.00	-1.22	-1.58	-0.82	-1.32
360.00	-1.58	-1.67	-1.28	-0.94

RP 2480.000 hor

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-1.38	-1.15	-1.24	-1.58	-1.09	-2.20	-2.18	-2.00
15.0	---	-1.51	-0.87	-1.24	-1.10	-1.24	-1.50	-1.30
30.0	---	-1.90	-0.52	-0.87	-0.63	-0.72	-0.92	-0.71
45.0	---	-2.34	-0.98	-0.61	-0.36	-0.36	-0.52	-0.22
60.0	---	-2.82	-1.49	-0.97	-0.49	-0.57	-0.34	-0.44
75.0	---	-3.94	-2.98	-1.89	-1.08	-0.83	-0.81	-0.33
90.0	---	-5.46	-5.28	-3.50	-2.15	-1.59	-1.65	-1.30
105.0	---	-7.80	-8.24	-6.96	-4.78	-3.63	-3.40	-2.91
120.0	---	-13.26	-24.86	-11.84	-8.99	-7.48	-7.63	-5.96
135.0	---	-7.23	-8.91	-14.31	-13.22	-13.07	-15.29	-11.55
150.0	---	-4.80	-5.96	-9.30	-9.05	-10.44	-12.10	-10.93
165.0	---	-3.25	-4.24	-4.78	-5.33	-6.37	-6.09	-6.48
180.0	---	-2.11	-3.02	-3.67	-4.69	-4.89	-5.43	-5.05
195.0	---	-2.80	-3.57	-3.86	-5.53	-6.00	-6.04	-6.09
210.0	---	-3.61	-4.20	-6.38	-7.82	-9.14	-9.18	-8.52
225.0	---	-4.62	-5.64	-7.11	-8.77	-9.12	-10.66	-8.45
240.0	---	-5.92	-7.81	-6.34	-6.71	-6.28	-5.78	-5.99
255.0	---	-5.74	-6.11	-4.79	-4.26	-3.81	-3.59	-3.73
270.0	---	-5.56	-4.89	-3.22	-2.48	-2.44	-2.39	-2.27
285.0	---	-5.39	-3.98	-2.49	-1.89	-2.01	-1.89	-1.83
300.0	---	-5.23	-3.23	-2.10	-1.95	-1.86	-1.78	-2.12
315.0	---	-3.80	-2.87	-1.77	-2.31	-1.66	-2.80	-1.71
330.0	---	-2.72	-2.54	-1.63	-2.31	-1.82	-2.76	-2.22
345.0	---	-1.87	-1.84	-1.57	-1.67	-2.31	-2.45	-2.56
360.0	---	-1.15	-1.24	-1.58	-1.09	-2.20	-2.18	-2.00

(continuation of the "RP\_2480.000\_hor" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-2.78	-2.86	-3.82	-1.63
15.0	-2.19	-2.07	-2.67	-1.54
30.0	-1.33	-1.33	-1.76	-1.46
45.0	-0.80	-0.72	-1.61	-1.38
60.0	-0.50	-0.42	-1.47	-1.30
75.0	-0.53	-0.88	-2.13	-2.49
90.0	-2.06	-2.05	-2.91	-4.12
105.0	-3.61	-4.82	-5.12	-6.76
120.0	-7.14	-8.81	-9.88	-14.63
135.0	-12.63	-13.71	-9.49	-8.81
150.0	-11.44	-12.18	-9.12	-6.41
165.0	-7.09	-7.34	-5.54	-4.87
180.0	-5.48	-4.86	-3.60	-3.74
195.0	-6.10	-4.22	-4.15	-4.36
210.0	-7.50	-7.11	-4.78	-5.09
225.0	-8.46	-7.06	-5.37	-5.97
240.0	-7.00	-5.79	-6.06	-7.07
255.0	-4.50	-4.36	-6.58	-6.74
270.0	-2.89	-4.42	-7.18	-6.43
285.0	-2.41	-3.28	-6.04	-6.14
300.0	-2.71	-2.42	-5.14	-5.87
315.0	-3.37	-3.47	-4.86	-4.37
330.0	-3.42	-4.30	-4.59	-3.25
345.0	-2.66	-4.14	-4.19	-2.36
360.0	-2.78	-2.86	-3.82	-1.63

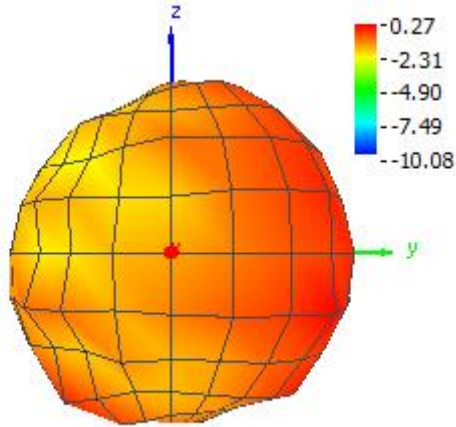
RP\_2480.000\_ver

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-9.28	-13.48	-17.70	-20.35	-15.66	-13.74	-9.53	-8.15
15.0	---	-9.31	-17.86	-21.87	-13.69	-12.38	-10.95	-9.09
30.0	---	-7.22	-18.03	-16.87	-14.70	-12.50	-11.84	-10.59
45.0	---	-5.82	-9.65	-13.16	-16.44	-11.98	-15.74	-9.45
60.0	---	-4.76	-6.97	-10.71	-16.79	-14.80	-12.55	-11.29
75.0	---	-3.44	-4.47	-7.83	-14.55	-15.94	-14.13	-10.96
90.0	---	-2.42	-2.90	-5.68	-11.47	-17.43	-12.27	-11.26
105.0	---	-1.60	-1.93	-3.99	-8.81	-13.88	-13.54	-10.45
120.0	---	-0.91	-1.14	-3.33	-6.82	-10.44	-12.73	-10.43
135.0	---	-1.92	-1.99	-3.15	-5.33	-8.16	-11.63	-11.75
150.0	---	-3.22	-3.06	-3.42	-4.72	-6.93	-10.02	-13.20
165.0	---	-5.10	-4.57	-4.67	-5.25	-6.64	-10.25	-12.91
180.0	---	-8.47	-6.91	-6.26	-7.17	-7.36	-10.27	-10.92
195.0	---	-6.96	-6.86	-7.71	-8.85	-8.83	-10.11	-8.85
210.0	---	-5.84	-6.81	-7.36	-9.66	-10.82	-10.47	-7.89
225.0	---	-4.95	-5.89	-7.42	-10.53	-13.38	-10.46	-8.19
240.0	---	-4.22	-5.12	-7.81	-12.08	-15.23	-11.18	-8.80
255.0	---	-4.29	-5.95	-8.66	-14.73	-17.46	-12.65	-8.96
270.0	---	-4.36	-6.98	-11.08	-19.80	-19.75	-12.34	-9.36
285.0	---	-4.44	-7.79	-13.08	-24.20	-17.35	-12.49	-9.32
300.0	---	-4.52	-8.78	-14.19	-25.65	-14.83	-12.91	-8.65
315.0	---	-5.59	-9.97	-14.84	-25.50	-15.36	-11.23	-8.06
330.0	---	-7.01	-11.61	-16.56	-23.58	-14.92	-10.56	-6.90
345.0	---	-9.14	-13.66	-18.72	-19.64	-14.20	-9.22	-8.18
360.0	---	-13.48	-17.70	-20.35	-15.66	-13.74	-9.53	-8.15

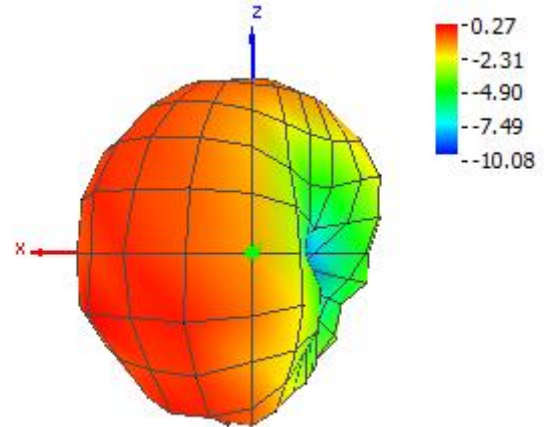
(continuation of the "RP\_2480.000\_ver" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-7.76	-7.85	-4.83	-9.31
15.0	-8.99	-9.66	-6.91	-9.18
30.0	-10.02	-11.08	-11.03	-9.05
45.0	-12.09	-11.26	-11.04	-8.92
60.0	-13.79	-9.47	-11.06	-8.80
75.0	-11.82	-7.60	-6.76	-7.37
90.0	-10.02	-6.29	-4.64	-6.29
105.0	-7.74	-5.46	-3.90	-5.43
120.0	-6.58	-5.62	-3.26	-4.71
135.0	-6.99	-6.38	-3.90	-5.55
150.0	-9.23	-8.03	-4.64	-6.59
165.0	-14.81	-11.77	-7.55	-7.96
180.0	-17.11	-12.89	-20.93	-9.96
195.0	-10.93	-9.69	-9.20	-8.89
210.0	-7.55	-5.85	-6.34	-8.03
225.0	-5.89	-5.11	-5.74	-7.31
240.0	-5.52	-4.89	-5.21	-6.69
255.0	-6.25	-5.05	-5.60	-6.39
270.0	-6.97	-6.75	-6.04	-6.11
285.0	-6.61	-6.70	-6.29	-5.85
300.0	-6.00	-5.05	-6.56	-5.60
315.0	-6.39	-2.64	-4.05	-6.27
330.0	-6.92	-3.39	-2.47	-7.07
345.0	-6.70	-5.10	-3.49	-8.05
360.0	-7.76	-7.85	-4.83	-9.31

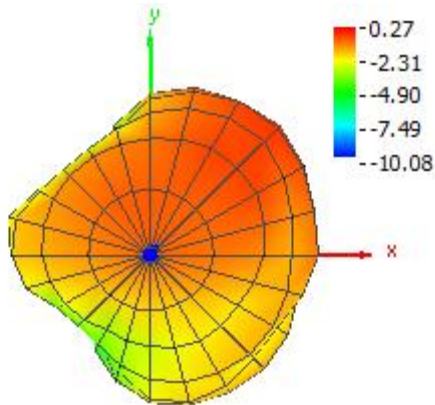
Theta = 90, Phi = 0



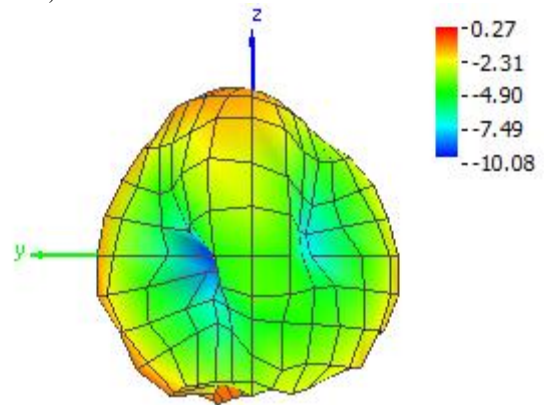
Theta = 90, Phi = 90



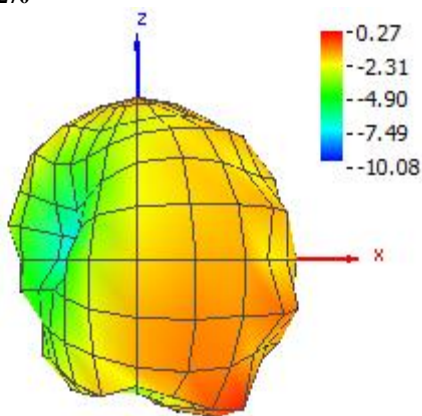
Theta = 0, Phi = 0



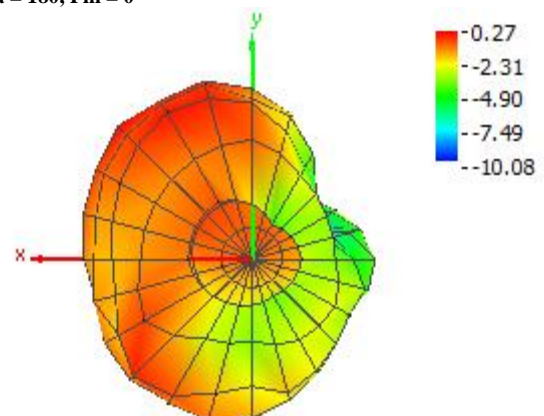
Theta = 90, Phi = 180



Theta = 90, Phi = 270



Theta = 180, Phi = 0





**1.6.7 Partial report no. 141/K34/D/2023/1g for measurement of RF Output Power radiated power measurement of Bluetooth Low Energy Transmitter, Sample #2, 2480, Set Power 0**

**Active OTA - Total Radiated Power Test**

**Common Information**

Test Description:	OTA Measurement, pattern of radiation power
Operating Conditions:	Normal, 800MHz - 6GHz - FAR Chamber
Operator Name:	Adam Jezak, Piotr Jopek, Robert Borowiec
Comment:	SS: CMW500, GSM, FSW Measurement: Max Peak - Zero Span

**EUT Information**

EUT Name:	Antena BLE
Manufacturer:	Vector
Serial Number:	SN: 1140398
Hardware Rev:	-
Software Rev:	-
Comment:	Ustawiona moc na urządzeniu 0, płaszczyzna XY, bateria w stronę masztu, 2480MHz

**Protocol**

**OTA Auto Test Template: Active OTA\_Max-Peak**

OTA Test Method:	Radiated Power Mobile Phone
Hardware Setup:	OTA Measurements\Active Antenna OTA
Mobile Phone Network:	<user defined>

TX: Zero-Span Max Peak, Resolution Bandwidth = 1 MHz	
Polarization = Hor,Ver; Azimuth = 0 - 360 deg; Elevation = 0 - (15) - 165 deg	
Radio Channel:	850 (128-251),1900 (512-810)

No measurements defined

**Hardware Setup: OTA Measurements\Active Antenna OTA**

Radiated Power Mobile Phone:	
Analyzer:	FSW43 for OTA @ VISA (ADR TCPIP0::192.168.0.50::inst0::INSTR), SN 1312.8000K43/103850, FW 5.21
Signal Path:	RadPower Vertical FSW
Signal Path2:	RadPower Horizontal FSW
Antenna:	QH800
Turntable:	Elevation @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Turn Device:	Azimuth @ LAN (ADR 192.168.0.101:200), FW maturo,NCD_163
Comm Tester:	<user defined>

Sensitivity Mobile Phone:	Not available
Antenna Measurement:	Not available





### Test Information

Test Method:	Radiated Power Mobile Phone
Test Condition:	FS: Free Space
Frequency:	2480.000 MHz
Test Time:	Start: 12/8/2023 11:52:38 AM; Stop: 12/8/2023 12:00:02 PM
Cal Data Hor:	49.92 dB (FSW43 to MeasAnt1 hor 2023)
Cal Data Ver:	50.02 dB (FSW43 to MeasAnt1 ver 2023)

### OTA Test Results for Channel 2480.000 MHz, 2480.000 MHz

OTA Evaluation Results:	
Total Radiated Power	-2.53 dBm
Peak EIRP	0.02 dBm
Directivity	2.55 dBi
Peak Gain	0.02 dBi
NHPRP 45°	-4.19 dBm
NHPRP 45° / TRP	-1.65 dB
NHPRP 45° / TRP	68.31 %
NHPRP 30°	-5.77 dBm
NHPRP 30° / TRP	-3.23 dB
NHPRP 30° / TRP	47.49 %
NHPRP 22.5°	-6.95 dBm
NHPRP 22.5° / TRP	-4.41 dB
NHPRP 22.5° / TRP	36.21 %
UHRP	-5.50 dBm
UHRP / TRP	-2.96 dB
UHRP / TRP	50.54 %
LHRP	-5.59 dBm
LHRP / TRP	-3.06 dB
LHRP / TRP	49.46 %
PGRP (0-120°)	-3.80 dBm
PGRP / TRP	-1.26 dB
PGRP / TRP	74.75 %
Front/Back Ratio	8.47
PhiBW	213.8 deg
PhiBW Up	64.8 deg
PhiBW Down	149.0 deg
ThetaBW	211.4 deg
ThetaBW Up	79.3 deg
ThetaBW Down	132.1 deg
Boresight Phi	45 deg
Boresight Theta	105 deg
Maximum Power	0.02 dBm
Minimum Power	-10.76 dBm
Average Power	-2.28 dBm
Max/Min Ratio	10.77 dB
Max/Avg Ratio	2.30 dB
Min/Avg Ratio	-8.48 dB
Worst Single Value	-26.75 dBm
Worst Position	Azi = 315 deg; Elev = 60 deg; Pol = Ver
Best Single Value	-0.20 dBm
Best Position	Azi = 60 deg; Elev = 90 deg; Pol = Hor

RP 2480.000\_tot

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.00	-1.20	-1.42	-1.51	-2.06	-1.58	-2.53	-2.22	-1.72
15.00	---	-1.32	-1.10	-1.59	-1.34	-1.37	-1.61	-1.16
30.00	---	-1.23	-0.72	-1.04	-0.72	-0.76	-0.91	-0.64
45.00	---	-1.15	-0.65	-0.56	-0.38	-0.22	-0.49	0.02
60.00	---	-1.06	-0.57	-0.63	-0.41	-0.49	-0.03	-0.21
75.00	---	-1.07	-0.79	-0.90	-0.75	-0.65	-0.57	-0.04
90.00	---	-1.09	-1.01	-1.40	-1.48	-1.36	-1.20	-0.90
105.00	---	-1.10	-1.17	-2.23	-3.06	-3.04	-2.96	-2.19
120.00	---	-1.11	-1.34	-2.90	-4.64	-5.50	-6.44	-4.67
135.00	---	-1.26	-1.51	-3.18	-5.03	-7.26	-10.76	-8.90
150.00	---	-1.42	-1.69	-2.96	-3.99	-6.03	-8.89	-9.39
165.00	---	-1.58	-1.87	-2.28	-2.93	-4.10	-5.19	-5.95
180.00	---	-1.75	-2.05	-2.29	-3.33	-3.45	-4.56	-4.37
195.00	---	-1.94	-2.38	-2.84	-4.35	-4.70	-5.07	-4.71
210.00	---	-2.13	-2.73	-4.24	-6.09	-7.57	-7.71	-6.03
225.00	---	-2.33	-3.14	-4.57	-6.94	-8.45	-8.92	-6.36
240.00	---	-2.54	-3.59	-4.23	-5.86	-6.22	-5.41	-4.94
255.00	---	-2.49	-3.33	-3.47	-4.06	-3.90	-3.58	-3.06
270.00	---	-2.44	-3.08	-2.75	-2.56	-2.60	-2.22	-1.88
285.00	---	-2.39	-2.79	-2.37	-2.07	-2.10	-1.81	-1.43
300.00	---	-2.34	-2.52	-2.15	-2.22	-1.94	-1.80	-1.64
315.00	---	-2.09	-2.49	-1.95	-2.67	-1.85	-2.74	-1.31
330.00	---	-1.86	-2.46	-1.99	-2.80	-2.18	-2.71	-1.67
345.00	---	-1.63	-1.96	-2.05	-2.23	-2.72	-2.36	-2.29
360.00	---	-1.42	-1.51	-2.06	-1.58	-2.53	-2.22	-1.72

(continuation of the "RP\_2480.000\_tot" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.00	-2.37	-2.36	-1.90	-1.41
15.00	-1.92	-1.94	-1.83	-1.26
30.00	-1.16	-1.28	-1.76	-1.11
45.00	-0.70	-0.60	-1.44	-0.97
60.00	-0.40	-0.21	-1.14	-0.84
75.00	-0.31	-0.20	-1.03	-1.46
90.00	-1.38	-0.72	-0.93	-2.20
105.00	-2.38	-2.32	-1.64	-3.08
120.00	-4.14	-4.14	-2.50	-4.18
135.00	-6.24	-5.84	-2.98	-3.89
150.00	-7.41	-6.74	-3.51	-3.62
165.00	-6.60	-5.94	-3.58	-3.37
180.00	-5.37	-4.26	-3.65	-3.13
195.00	-5.35	-3.32	-3.27	-3.43
210.00	-5.18	-3.90	-2.91	-3.75
225.00	-4.78	-3.51	-3.00	-4.09
240.00	-3.98	-2.91	-3.08	-4.46
255.00	-2.89	-2.35	-3.61	-4.21
270.00	-1.92	-3.01	-4.20	-3.98
285.00	-1.51	-2.17	-3.73	-3.76
300.00	-1.66	-1.07	-3.31	-3.56
315.00	-2.32	-0.78	-2.07	-2.91
330.00	-2.56	-1.60	-1.11	-2.35
345.00	-1.97	-2.35	-1.49	-1.85
360.00	-2.37	-2.36	-1.90	-1.41

RP 2480.000 hor

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-1.73	-1.63	-1.62	-2.14	-1.72	-2.74	-2.82	-2.53
15.0	---	-1.95	-1.18	-1.64	-1.54	-1.64	-1.92	-1.73
30.0	---	-2.29	-0.78	-1.14	-0.85	-0.97	-1.16	-0.94
45.0	---	-2.66	-1.14	-0.77	-0.46	-0.42	-0.58	-0.29
60.0	---	-3.06	-1.55	-1.01	-0.50	-0.58	-0.20	-0.41
75.0	---	-4.23	-2.93	-1.79	-0.95	-0.72	-0.72	-0.24
90.0	---	-5.82	-4.98	-3.25	-1.99	-1.43	-1.42	-1.14
105.0	---	-8.38	-7.94	-6.43	-4.47	-3.34	-3.20	-2.64
120.0	---	-15.37	-24.98	-11.08	-8.45	-6.90	-7.13	-5.56
135.0	---	-7.89	-9.38	-14.43	-12.91	-12.34	-13.93	-10.83
150.0	---	-5.29	-6.43	-9.83	-9.45	-10.68	-12.29	-10.85
165.0	---	-3.67	-4.55	-5.07	-5.63	-6.57	-6.28	-6.59
180.0	---	-2.50	-3.25	-3.90	-4.83	-5.01	-5.46	-5.12
195.0	---	-3.24	-3.83	-4.08	-5.66	-6.11	-6.13	-6.18
210.0	---	-4.14	-4.51	-6.68	-8.12	-9.45	-9.59	-8.93
225.0	---	-5.28	-6.13	-7.74	-9.39	-9.80	-11.60	-9.26
240.0	---	-6.83	-8.75	-7.04	-7.20	-6.78	-6.18	-6.53
255.0	---	-6.59	-6.80	-5.30	-4.54	-4.07	-3.89	-3.98
270.0	---	-6.36	-5.46	-3.57	-2.67	-2.64	-2.49	-2.47
285.0	---	-6.14	-4.47	-2.82	-2.11	-2.18	-2.04	-1.96
300.0	---	-5.94	-3.67	-2.45	-2.24	-2.08	-2.01	-2.29
315.0	---	-4.40	-3.32	-2.20	-2.68	-1.98	-3.17	-2.01
330.0	---	-3.27	-3.00	-2.16	-2.82	-2.33	-3.24	-2.72
345.0	---	-2.38	-2.26	-2.16	-2.29	-2.91	-3.07	-3.14
360.0	---	-1.63	-1.62	-2.14	-1.72	-2.74	-2.82	-2.53

(continuation of the "RP\_2480.000\_hor" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-3.32	-3.47	-4.27	-1.98
15.0	-2.54	-2.55	-3.07	-1.83
30.0	-1.53	-1.66	-2.13	-1.69
45.0	-0.89	-0.91	-1.74	-1.55
60.0	-0.51	-0.55	-1.39	-1.41
75.0	-0.49	-0.81	-2.06	-2.59
90.0	-1.79	-1.79	-2.85	-4.21
105.0	-3.47	-4.56	-5.03	-6.83
120.0	-6.87	-8.27	-9.62	-14.43
135.0	-11.86	-12.82	-9.53	-8.95
150.0	-11.30	-12.29	-9.44	-6.60
165.0	-7.24	-7.34	-5.70	-5.08
180.0	-5.55	-4.87	-3.72	-3.96
195.0	-6.34	-4.28	-4.39	-4.69
210.0	-7.98	-7.44	-5.20	-5.56
225.0	-9.15	-7.74	-5.90	-6.65
240.0	-7.62	-6.53	-6.74	-8.11
255.0	-4.95	-5.00	-7.27	-7.65
270.0	-3.15	-4.81	-7.88	-7.24
285.0	-2.69	-3.59	-6.57	-6.87
300.0	-3.05	-2.76	-5.56	-6.52
315.0	-3.77	-3.86	-5.23	-4.87
330.0	-3.91	-4.75	-4.92	-3.68
345.0	-3.23	-4.68	-4.58	-2.74
360.0	-3.32	-3.47	-4.27	-1.98

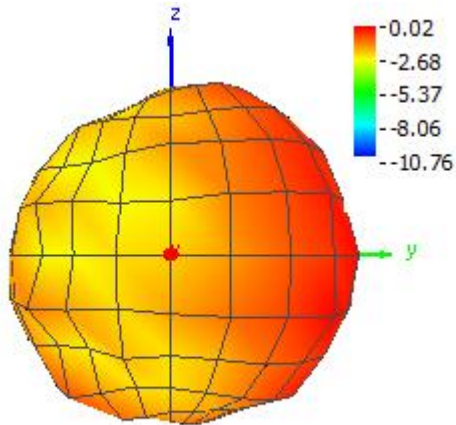
RP\_2480.000\_ver

Azimuth (deg)	Elevation 0 deg (dBm)	Elevation 15 deg (dBm)	Elevation 30 deg (dBm)	Elevation 45 deg (dBm)	Elevation 60 deg (dBm)	Elevation 75 deg (dBm)	Elevation 90 deg (dBm)	Elevation 105 deg (dBm)
0.0	-10.62	-14.52	-17.41	-19.48	-16.54	-15.87	-11.11	-9.44
15.0	---	-10.05	-18.33	-21.01	-14.78	-13.58	-13.24	-10.29
30.0	---	-7.89	-19.50	-17.19	-15.95	-14.09	-13.54	-12.45
45.0	---	-6.46	-10.30	-13.76	-17.71	-13.65	-17.44	-11.69
60.0	---	-5.38	-7.56	-11.41	-17.31	-17.14	-14.33	-13.66
75.0	---	-3.94	-4.88	-8.25	-14.29	-19.16	-15.21	-13.59
90.0	---	-2.86	-3.24	-6.00	-10.99	-19.18	-14.12	-13.64
105.0	---	-2.00	-2.20	-4.30	-8.64	-14.77	-15.56	-12.28
120.0	---	-1.28	-1.36	-3.62	-6.99	-11.09	-14.78	-12.00
135.0	---	-2.33	-2.29	-3.52	-5.80	-8.87	-13.61	-13.34
150.0	---	-3.72	-3.46	-3.96	-5.45	-7.85	-11.54	-14.83
165.0	---	-5.77	-5.23	-5.51	-6.28	-7.73	-11.72	-14.58
180.0	---	-9.80	-8.25	-7.38	-8.67	-8.64	-11.82	-12.36
195.0	---	-7.80	-7.84	-8.89	-10.20	-10.27	-11.70	-10.11
210.0	---	-6.43	-7.46	-7.92	-10.36	-12.13	-12.25	-9.15
225.0	---	-5.40	-6.17	-7.42	-10.60	-14.17	-12.28	-9.47
240.0	---	-4.56	-5.17	-7.45	-11.64	-15.44	-13.30	-10.08
255.0	---	-4.63	-5.93	-8.11	-13.90	-18.15	-15.16	-10.23
270.0	---	-4.70	-6.84	-10.38	-18.47	-22.42	-14.30	-10.84
285.0	---	-4.77	-7.72	-12.41	-22.18	-19.94	-14.79	-10.88
300.0	---	-4.84	-8.83	-13.81	-25.35	-16.79	-14.93	-10.25
315.0	---	-5.94	-10.05	-14.62	-26.75	-17.22	-12.99	-9.56
330.0	---	-7.41	-11.74	-16.27	-25.30	-16.97	-12.10	-8.34
345.0	---	-9.65	-13.71	-18.20	-21.16	-16.26	-10.56	-9.78
360.0	---	-14.52	-17.41	-19.48	-16.54	-15.87	-11.11	-9.44

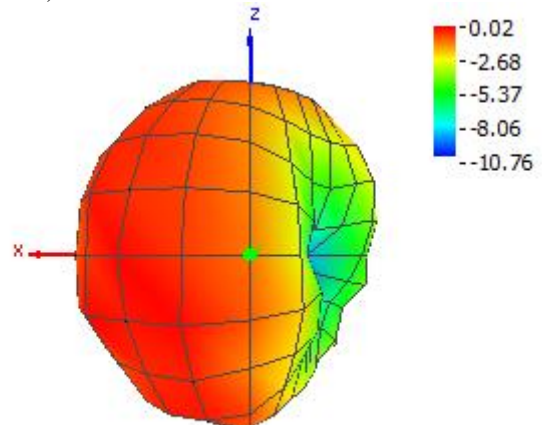
(continuation of the "RP\_2480.000\_ver" table from column 9 ...)

Azimuth (deg)	Elevation 120 deg (dBm)	Elevation 135 deg (dBm)	Elevation 150 deg (dBm)	Elevation 165 deg (dBm)
0.0	-9.44	-8.83	-5.66	-10.52
15.0	-10.68	-10.74	-7.88	-10.36
30.0	-12.00	-12.06	-12.66	-10.20
45.0	-14.41	-12.20	-13.11	-10.05
60.0	-16.57	-11.47	-13.62	-9.91
75.0	-14.36	-9.02	-7.80	-7.88
90.0	-11.81	-7.30	-5.39	-6.50
105.0	-8.94	-6.25	-4.31	-5.45
120.0	-7.44	-6.25	-3.44	-4.61
135.0	-7.63	-6.81	-4.07	-5.52
150.0	-9.68	-8.15	-4.79	-6.67
165.0	-15.23	-11.55	-7.72	-8.25
180.0	-19.38	-13.07	-21.79	-10.74
195.0	-12.27	-10.33	-9.68	-9.42
210.0	-8.41	-6.44	-6.80	-8.42
225.0	-6.75	-5.57	-6.12	-7.60
240.0	-6.43	-5.39	-5.53	-6.91
255.0	-7.12	-5.75	-6.05	-6.84
270.0	-8.02	-7.71	-6.64	-6.76
285.0	-7.73	-7.70	-6.92	-6.69
300.0	-7.28	-6.00	-7.23	-6.61
315.0	-7.77	-3.73	-4.94	-7.31
330.0	-8.29	-4.48	-3.44	-8.14
345.0	-7.99	-6.17	-4.41	-9.17
360.0	-9.44	-8.83	-5.66	-10.52

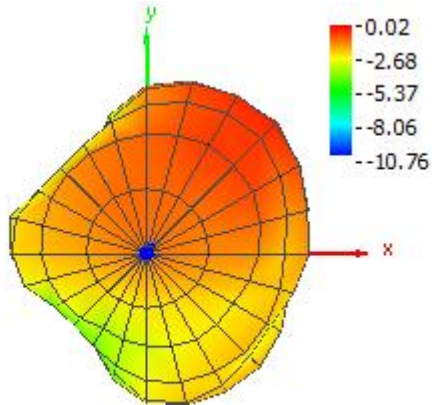
Theta = 90, Phi = 0



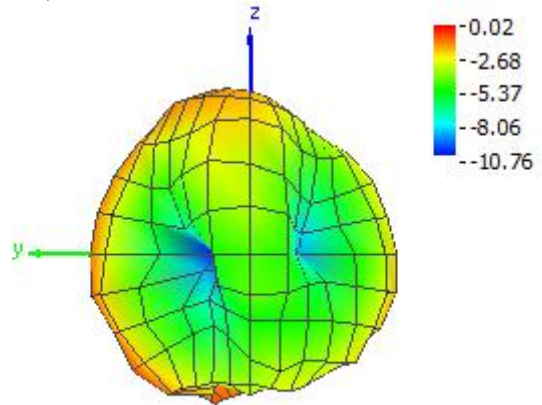
Theta = 90, Phi = 90



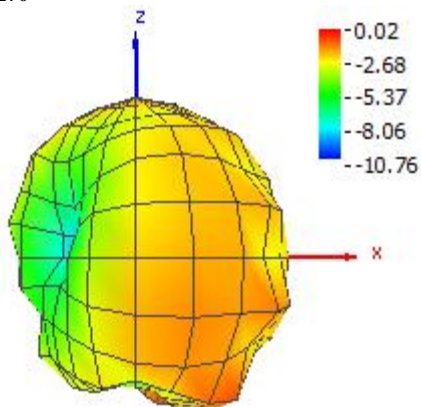
Theta = 0, Phi = 0



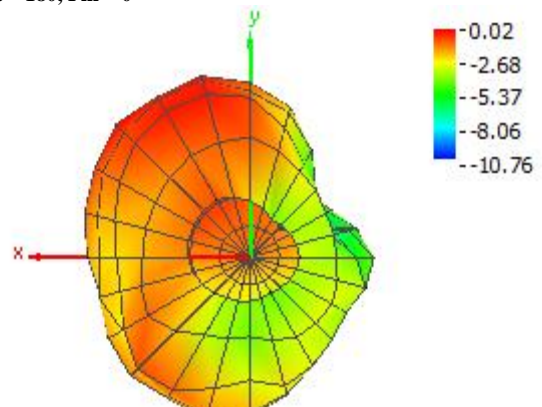
Theta = 90, Phi = 180



Theta = 90, Phi = 270



Theta = 180, Phi = 0



**APPENDIX NO.2 – TEST PLAN (K) / PROGRAM BADAŃ (K)**

No.	Measuremnts for a single DUT:	Description
1	RF output power, pomiar radiowy zgodnie z EN 300 328 v2.2.2 punkt 5.4.2.2 Ilość pomiarów: 6	Pomiar radiowy w warunkach normalnych na dolnej, górnej i środkowej częstotliwości pracy w trybie TX przy ustawieniu maksymalnej mocy z jaką ma pracować urządzenie w temperaturze 23°C i nominalnym napięciu zasilania
2	RF output power, pomiar radiowy zgodnie z EN 300 328 v2.2.2 punkt 5.4.2.2 Ilość pomiarów: 1	Pomiar radiowy w warunkach normalnych na dolnej częstotliwości pracy w trybie TX przy ustawieniu mocy na wartość 8 w panelu sterującym urządzenia celem sprawdzenia regulacji mocy w urządzeniu. Pomiar w temperaturze 23°C i nominalnym napięciu zasilania